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The Author of each Article is responsible for the facts and opinions recorded.

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ERRATA.

Page 2, line 4 from bottom—For "*coarcta*" read "*coarctata.*"

Page 3, lines 4 and 3 from bottom—For "are generally conceded to be of volcanic origin" read "are by some supposed to be of volcanic origin."

Page 67, line 9—For "Eocene" read "Miocene."

Page 90, line 21—For "14th" read "15th."

Page 91, line 1—For "14th" read "15th."

Page 94, line 16—For "CARANOIDÆ" read "CARANGIDÆ."

Page 135, line 1—For "*Damara australis*" read "*Dammara robusta.*"

Page 160, line 23—After "top," insert "920 feet above sea-level."

Page 189, line 12—Omit "the previous season's."

Page 203, line 14—For "*longesetosa*" read "*longicornis.*"

Page 203, line 15—Omit "Procession" and add "one of the procession caterpillars."

The Victorian Naturalist.

Vol. XXVIII.—No. 1. MAY 4, 1911. No. 329.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday, 10th April, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From His Excellency Sir Thomas Gibson-Carmichael, K.C.M.G., thanking the Club for its expression of regret at his departure from the State, and signifying his pleasure at the existence in Victoria of so many organizations for stimulating an interest in the study of nature.

From Mr. C. Waters, resigning his office as assistant secretary, owing to pressure of other work.

REPORTS.

A report of the excursion to Hampton on Saturday, 25th March, was given by the leader, Mr. C. J. Gabriel, who reported that, favoured by a beautiful afternoon and a very low tide, an interesting time had been spent by a fairly numerous party. A large number of starfish, worms, molluscs, &c., were secured under the shingle, which was uncovered for several hundred yards from the shore-line. A notable observation made was the fact of the gradual disappearance of the rock-boring molluscs of the genus Barnea, formerly known as Pholas, from the northern parts of Port Phillip Bay. This has been caused probably by the discharge of deleterious drainage and silt into the Bay, and has affected both species, *Barnea australasica*, Sow., and *B. obturamentum*, Hed., of which living specimens are now difficult to obtain north of Beaumaris.

A report of the excursion to Mont Albert, on Saturday, 8th April, was given by the leader, Mr. F. Chapman, A.L.S., who reported a good attendance of members. The afternoon had been devoted to the geology and physiography of the district, and considerable interest had been evinced in the subject by the members of the party.

A report of the junior excursion to Clifton Hill Quarry on Saturday, 1st April, was given by the leader, Mr. J. S. Kitson, who stated that about twelve juniors attended. It was found that the quarry was being opened up in a new direction, but the stone excavated contained very few specimens of Zeolites and other minerals for which the quarry is famous. On the

southern side a cut was being made, in which the old river bank, consisting of black loamy soil, was exposed. This was found to contain quantities of charred sticks and roots, as well as a trunk of a tree, which was also completely charred.

ELECTION OF MEMBER.

On a ballot being taken, Mr. S. B. Abbot, Mines Department, Bendigo, was duly elected a country member of the Club.

GENERAL BUSINESS.

The president referred to the advancement of Messrs. D. McAlpine and O. A. Sayce, A.L.S., in their respective positions, and to the death of Mr. F. M. Reader, a well-known botanical worker.

Mr. A. H. E. Mattingley, C.M.Z.S., said that he had received a letter from Mr. J. Buckland, of London, with reference to the efforts being made to secure the passage of the Plumage Bill, and soliciting subscriptions towards propaganda work.

PAPERS READ.

1. By Mr. G. W. Robinson, C.E. (communicated by Mr. C. French, F.E.S.), entitled "In the Dandenong Ranges Sixty Years Ago."

The author briefly described the conditions under which enormously tall specimens of *Eucalyptus regnans* had flourished in the Dandenong Ranges in the early sixties, and gave the measurement of the tallest which had come under his notice. This was a felled tree, and measured 342 feet to where the top was broken off, which, judging by the diameter of the stem there, must have been from 15 to 20 feet in length, giving a probable total of 360 feet. From what he had heard and seen, he believed that it was quite possible trees of 400 feet in height had existed when splitting commenced, but that they were soon picked out and utilized for commercial purposes.

In reply to Mr. Barnard, the author said that the figures often quoted as his for trees on Mount Baw Baw were estimated, not actual, measurements. Dr. Hall expressed the hope that the author would be able to place further records before the Society. Mr. A. D. Hardy, F.L.S., said that the official records of the Forest Department showed no authentic records of over 326 feet, and though years ago the Government had offered rewards for trees of 400 feet, none were ever reported.

2. By Mr. A. D. Hardy, F.L.S., entitled, "Notes of a Contest between *Diamma bicolor* and *Gryllotalpa coarcta*."

The author drew attention to the great economic value of the Hymenoptera to orchardists, graziers, &c., and gave an account of the stinging of a mole cricket by the apterous female

of a fossorial wasp, *Diamma bicolor*, often called the " blue ant " or " black ant ; " the behaviour of the wasp during the stinging process, and the subsequent condition of the cricket, which, after a month in a tin box, without food, was lively and apparently well.

Some discussion ensued, in which Dr. Hall and Messrs. Sayce, Best, and Spry took part.

NATURAL HISTORY NOTES.

Natural Wood-Fibre.—Mr. D. J. Mahony, M.Sc., contributed a note descriptive of some wood-fibre exhibited by him. This had been found near Stony Creek, between the M'Kenzie and Bemm Rivers, East Gippsland. The finder, Mr. E. Manton, noticed a stringybark tree, *Eucalyptus*, sp., about four feet in diameter, which appeared to have been struck by lightning, a deep furrow having been gouged in it from top to bottom, the tree remaining standing. The wood from this furrow, instead of being merely splintered, was reduced to fibre, as exhibited, and scattered about near the tree, while the bark was reduced to pulp. Some of the strands were 18 inches long. For a week before the fibre was found, storms, accompanied by unusually violent thunder and lightning, had raged in the locality, culminating on Wednesday, 8th March, when, according to newspaper reports, many square miles of forest near Mount Taylor were destroyed. Mr. Manton considered that the tree had been struck by lightning during this disturbance. In view of the high price of vegetable fibres for commercial purposes, it is possible that it might pay to produce similar material from certain eucalypts by artificial means.

Mr. F. Pitcher said that similar fibre had been found some years ago, and inquiry had been made at the time as to the practicability of growing stringybark trees for fibre production.

Mr. A. D. Hardy, F.L.S., said that Mr. A. W. Crooke, Chief Clerk of the Forest Department, had told him of similar fibre having been found in the Creswick State Forest after a cyclonic storm had swept through a portion of it. Many trees had been twisted between crown and butt, and the fibre ravelled out and blown about in the forest.

Bodies Resembling Australites (Obsidianites). — Mr. D. J. Mahony, M.Sc., also contributed a note on the occurrence of certain microscopic bodies in locomotive smoke, glass-wool, and " Pele's hair " (a volcanic product from Krakatoa), which much resemble Australites in shape. Australites, or obsidianites, appear to be found only in Australia, and are generally conceded to be of volcanic origin. They are remarkable chiefly on account of their symmetrical forms, which are due to some cause other than that which explains the regular shapes of

crystals. The little bodies which he had found seemed to be almost certainly formed from minute pieces of molten slag, which have been whirled into the air and solidified during their flight. Among them are several shapes closely approximating the hypothetical shapes which mathematicians have assigned to liquids rotating freely in space. He announced his intention of preparing a paper in which he hoped to deal thoroughly with the resemblances in shape existing between these bodies, Australites, volcanic bombs, and a hypothetical freely-revolving liquid.

EXHIBITS.

By Mr. F. G. A. Barnard.—Wild-flowers from Plenty Ranges, including *Epacris impressa*, *Styphelia scoparia*, *Tetratheca ericinum*, *Bœckea diffusa*, and *Grevillea alpina*.

By Mr. F. Chapman, A.L.S.—Crystalline quartz from the Templestowe anticlinal; Tertiary sandstone (in section), with angular sand grains and concretion of Tertiary sand, from Balwyn Hill.

By Mr. A. D. Hardy, F.L.S.—Fossorial wasp, *Diamma bicolor* (female), "black ant" or "blue ant": also an Australian mole cricket, *Gryllotalpa coarcta*, alive, in illustration of paper.

By Mr. D. J. Mahony, M.Sc.—Wood-fibre from East Gippsland, in illustration of note.

By Mr. A. H. E. Mattingley, C.M.Z.S. — A young Dormouse Phalanger, *Dromicia nana* (?), from the Mallee at Underbool, North-West Victoria. New for the Mallee.

By Mr. A. L. Scott.—Magnesite and ropy basalt, from Clifton Hill Quarry; granites from Station Peak, You Yangs, and from Buffalo Mountains.

By Mr. J. Searle. — Lizard, *Lygosoma*, sp., from Plenty Ranges.

By Mr. P. R. H. St. John.—Specimens of *Dampiera stricta*, R. Brown, white-flowered form, not previously recorded for Victoria, collected by exhibitor, Nyora, 1st November, 1910; *Eucalyptus amygdalina*, Labillardiere, with variegated leaves, not previously recorded for Victoria, collected by exhibitor, Research district, 8th April, 1911; *Prostanthera lasianthos*, Labillardiere, with variegated leaves, not previously recorded for Victoria, collected by J. G. O'Donoghue, Research district, 8th April, 1911; *Erica arborea*, Linnæus, Tree Heath, order Ericaceæ, Mediterranean regions, not previously recorded as introduced for Victoria, collected by exhibitor, Research district, 8th April, 1911.

After the usual conversazione the meeting terminated.

NOTES ON THE SANDRINGHAM FLORA.

By C. S. SUTTON, M.B.

(*Read before the Field Naturalists' Club of Victoria, 10th Oct.*, 1910.)

THE species composing the native vegetation now covering the area lying between Sandringham and Mordialloc, and extending back from the sea a varying distance, as far as the neighbourhood of Oakleigh and Spring Vale, are collectively known to us as the "Sandringham flora." Although the present limits of the "formation" cannot now be exactly defined, it may be said, speaking roughly, that originally it ranged to St. Kilda, Sandridge, and Emerald Hill, and covered a great part of what is now Prahran, Malvern, and Caulfield, and a perhaps smaller portion of Hawthorn and Camberwell.

Bunce, in his "Australasiatic Reminiscences" (1857), says: —"After crossing Gardiner's Creek, leaving the river on our left, we travelled over a piece of rising, sandy ground, which formed a belt between the Yarra Yarra and the sandy heath which we found in the neighbourhood of Brighton. This place was richly covered with low shrubs and plants of a heathy nature. Leucopogon (several species), Astroloma (or native cranberry), Epacris (white and red), a dwarf species of Casuarina, Tetratheca, Eriostemon, several species of dwarf integral-leaved Acacia or wattles, Leptospermum, Hippuris (or Mare's Tail), Daviesia, Pultenæa, and Pleurandria, were among the most prominent."

Further evidence of the close approach of the heath "formation" to Melbourne is to be found in Hannaford's "Jottings in Australia" (1856), where such important constituents of the flora as *Epacris impressa*, Labill., *Leucopogon Richei*, Br., *Correa virens*, Sm. (*C. speciosa*, Andr.), *Aotus villosa*, Sm., *Cassytha pubescens*, Br., *Rhagodia Billardieri*, Br., *Senecio rupicola*, Lesson and Richard (*Senecio lautus*, Forst.), *Trachymene diversifolia*, F. v. M. (*T. heterophylla*, F. v. M.), and *Erythræa australis*, Br., are noted as occurring at St. Kilda, and *Pleurandria sericea*, Br. (*Hibbertia densiflora*, F. v. M.), *Hibbertia prostrata*, Hook. (*H. fasciculata*, Br.), *Ricinocarpus sidæformis*, Ferd. v. Mueller (*R. pinifolius*, Desf.), *Bossiæa cinerea*, Br., *Leucopogon virgatus*, Br., and *Didiscus pilosus*, Benth., at or near Liardet's Beach, or Sandridge, now Port Melbourne.

The Sandringham flora has thus, in the first place, a sentimental interest to us, in having at one time occurred over nearly the whole area now covered by the southern suburbs of Melbourne.

The flora is practically interesting in being the richest and most convenient to us for purposes of collection and study, affording, as it does, seashore, land, and (to a lesser degree)

water plants, and containing a comparatively large number of species representing the most important and characteristic orders of Victorian plants; hence, a knowledge of its members means a good insight into the larger Victorian flora. To many of us living in the metropolis, indeed, it serves as the principal standard by which we measure the floras of other more distant localities. Unfortunately, what remains of it is so rapidly passing away with the extension of the city southward that in another ten years, perhaps, fragments alone will be left of it. For this reason alone, if for no other, it seems worth while to attempt its description in terms of the œcologists, and to put on record, as completely as possible, a census of its species.

As far as can be found the only efforts that have been made to more or less systematically describe this flora are those of Mr. C. A. Topp, M.A., F.L.S., in "The Handbook of Melbourne," for the use of the members of the Australasian Association for the Advancement of Science, Melbourne meeting, 1900, and that of Mr. G. Weindorfer in his short but interesting description of an excursion to Sandringham in December, 1903, contained in vol. xx. of the *Victorian Naturalist.*

The type of vegetation covering the district mentioned, excepting certain small areas within it, the foreshore, and the cliffs and their vicinity, is one which, according to Schimper, is common to mild temperate regions, where the bulk of the rainfall happens in winter, the summers are dry, and where the substratum is a sandy soil liable to become parched in the dry season. Although its general character is due to these factors, which are all present, and to some others of lesser importance, the fact that the formation corresponds more or less closely with the low, undulating geologic area known as the 'red beds,' the upper part of which has been leached of its iron, leaving a surface of loose sand, makes it an 'edaphic' rather than a 'climatic' formation.

A varying significance has been attached to the term 'formation' by œcologists, but Warming defines it as a community of species which have become associated together by definite edaphic or climatic conditions, and which has a certain fixed appearance, or 'physiognomy,' dependent on the dominant growth forms, the density, height, and colour of the vegetation, the number and duration of life of the species, and their seasonal relationships. The one under consideration at first seems referable to his 'dwarf shrub formation,' and, from the continual occurrence of several species of Epacrids, might in that case be described as a dwarf shrub 'heath'; but the thick layer of raw humus, the most characteristic feature of heath grounds, is not apparent here, and the formation is both taller and more complex than in European 'heaths.'

Rather, it would appear to have much closer affinities to the *maqui* (sclerophyllous scrub-land) of parts of the Mediterranean coast (1 to 3 metres), and particularly to the *maqui* of South Africa, this, according to the authority above-mentioned, representing 'a transition from the low, dwarf, shrub heath of the north to the xerophytic bush-land of the tropics.'

The Sandringham *maqui*, then, consists of a dominant xerophytic vegetation of dull greyish, evergreen, woody plants, close set, of an average height of little more than a metre, and contains a rich admixture of species ('compound' formation), the frequent occurrence of several Epacrids being a marked feature. The leaves are such as are found in plants growing under conditions where excessive transpiration is to be guarded against. Many of the plants are aphyllous, or nearly so—Cassythas, Amperea, Casuarinas, Exocarpus, Sphærolobium, Viminaria. With few exceptions, the leaves are small, thick, simple, entire, very frequently linear, and often with rolled edges, as in Ricinocarpus, *Pultenæa paleacea*, Dillwynias. Sclerophylly is more particularly seen in Hakeas, Epacrids, *Daviesia ulicina*, *Platylobium obtusangulum*—all of which, in addition to many others, are armed with pungent points. Filling the gaps between the taller hard plants is a subordinate lower stratum of softer herbs (in which segmented leaves are frequent), grasses, and tuberous plants.

The vegetation of the main portion of the area having thus been briefly sketched, its individual species will be referred to later.

In considering the Sandringham plants with some detail, they may be naturally divided into four zones. The first is submarine, covering the ground below low water mark, and, apart from the algæ and lower vegetable forms (*plankton* and *benthos* formations), possibly includes among spermophytes the Sea-tassel, Ruppia; Grass-wrack, Zostera; and Sea-nymph, Cymodocea (enhalid formation). It need not be further considered here.

The second zone, occurring between low water mark and the cliff base, is subject to periodical or intermittent inundation, and mostly comprises species of very wide, even world-wide, distribution, with representatives of families well known to be partial to saline situations or capable of growing in these as well as in other places (halophyte formation). These plants present certain peculiarities, such as reduction of surface, succulence, lignification, and a prostrate habit, among others, which have been found protective against excessive transpiration, and are probably required, according to Schimper, owing to the difficulty the plants find in absorbing water containing

too great a proportion of salt. It is interesting to note that these peculiarities are not found in halophytes only, but are also present in plants growing in very different situations and under widely different conditions, where, owing to acidity (in peat bogs), extreme coldness (in arctic and alpine places), or aridity (in deserts, on rocks, or the bark of trees), the same difficulty of absorption exists and the same necessity for conservation of absorbed water obtains. The soil or substratum being in all these cases either actually (physically) or physiologically dry.

Of the families usually described as markedly halophilous, nearly all are represented. The few exceptions are the Tamarinaceæ, Rhizophoraceæ, and Asparageæ, which would not be looked for; Plumbaginaceæ, of which the world-wide "Sea Lavender," *Statice taxanthema*, is found elsewhere on the shores of Port Phillip; and the Zygophyllaceæ, the Victorian members of which are confined, with two exceptions, to the north-west of the State.

Perhaps the most interesting of the foreshore plants are those found about Picnic and Rickett's Points and other places towards Beaumaris, growing in the cracks and crevices of the flat reefs periodically covered by the tides. They may be said to constitute an 'association' of lithophilous halophytes —chasmophytes—and, save in the salt marshes near the Yarra mouth, where some of them are abundant, and near the Albert Park Lagoon, where a couple of them are still existent, they hardly occur elsewhere. At a little distance they show, in size, succulence, and habit, a strong family likeness, although widely separated systematically. They have, in fact, in adapting themselves to the surroundings, come to possess similar 'growth forms' (epharmonic convergence). Two of them belong to the Salsolaceæ, most halophilous of all plant families —the "Sea Crab-grass," *Salicornia australis*, occurring abundantly, and that veritable cosmopolite, the "Sea-blite," *Suæda maritima*, only infrequently. Every here and there the "Smooth Sea-heath," *Frankenia lævis*, almost as widespread a plant as the last, is found. No other is so venturesome, and in December its pretty pinkish-white flowers were seen blossoming even under the wave. Another wide ranger, the "Creeping Brookweed," *Samolus repens*, of the Primulaceæ, is closely associated with *Wilsonia rotundifolia*, of the Convolvulaceæ, and the Amaranth, *Hemichroa* (*Polycnemon*) *pentandra*. About Ricketts Point these three seem to be equally prevalent, and the two latter are notable as having a more restricted endemismus than any of the others, not extending beyond Australia. Of the rest, *Mesembryanthemum australe*, the "Austral Pig-face," strays here from the cliff, and

the tiny little "Sand Club-rush," *Scirpus arenarius*, of the Cyperaceæ, occasionally makes its appearance.

Turning now from the rocks, we find in the loose sand another association—psammophilous halophytes—in which the Salsolaceæ is again well represented by the "Grey Saltbush," *Atriplex cinereum*, with glaucous foliage and purplish flower masses; the "Prickly Glasswort," *Salsola kali*, another real cosmopolite; the "Saloop Saltbush," *Rhagodia hastata*; the "Fat Hen," *Chenopodium album*; and the "Oak-leaved Goosefoot," *C. glaucum*. With these is frequently found a crucifer, the "Sand Rocket," *Cakile maritima*, again of world-wide range. The most striking grass is the curious sprawling *Spinifex hirsutus*, the "Hairy Spinifex," patches of which, bearing flowers of different sex, may be found widely separated. It is, however, much more abundant in the sand hummocks near Brighton Beach. Two noticeable introduced plants are just here making themselves very much at home—the "Horned Poppy," *Glaucium luteum*, in particular, with its handsome hoary foliage, bright yellow flowers, and inordinately long fruits, is spreading widely, while the other, *Nolana prostrata*, a succulent prostrate plant of the Campanulaceæ, with bluish bell-shaped flowers, is more slowly extending its influence.

Many other plants venture from the cliff base a little distance, where the sand has been bound by material washed from the cliffs above, and more widely where the "Salt-grass," *Distichlis maritima*, the "Couch-grass," *Cynodon dactylon*, the "Spinifex," the "Curved Snake-tail Grass," *Lepturus incurvatus*, and especially the introduced "Sea-lime Grass," *Elymus arenarius*, have reduced the shifting grains to stability, and so paved the way for their coming. Of the species found in this debatable ground, which is only rarely flooded, may be first mentioned the umbelliferous, lush green "Sea Celery," *Apium prostratum*, corresponding to the garden celery, *A. graveolens*, wild on old-world coasts. It is the first halophil, except the Glaucium, met with, having divided leaves. The "Coast White-bush," *Calocephalus Brownii*, is often noticed here, less often the grey "Coast Aster," *Aster axillaris*, not infrequently the little "Grass Daisy," *Brachycome graminea*; *Stuartiana Muelleri*; the "Jersey Cudweed," *Gnaphalium luteoalbum*; the coast form of the "Sow Thistle," *Sonchus oleraceus*, coarser and more succulent than in the inland form, and several other introduced composites. *Lobelia anceps* is also here, and the "Swampweed," *Selliera radians*, the "Rayed Carrot," *Daucus brachiatus*, the "Kidney Weed," *Dichondra repens*, and even the "Water Dock," *Rumex bidens*, and the "Spreading Flax-lily," *Dianella revoluta*. Now and again, too, the big brother of the "Austral Pigface," *Mesembryanthemum aquilaterale*, "the Angled Pig-

face," comes down, and the "Warrigal Cabbage," *Tetragona implexicoma*, and the "Sea Berry," *Rhagodia Billardieri*, which vie with one another in forming dense screens and entanglements among the shrubs on the cliff above, hang down and venture in the sand. Others which may be mentioned as occurring here, not naming many aliens, are the "Knotted Club-rush," *Scirpus nodosus*; the "Spreading Sedge," *Carex pumila*; the "Hairy Centrolepis," "*C. strigosa*; and the grasses *Stipa semibarbata*, the "Fibrous Spear-grass," *Dichelacne crinita*, the "Long-hair Plume-grass," *Poa Labillardiere*, the "Blue Meadow-grass," and *Stipa teretifolia*, the dense, tussocky "Round-leaved Spear-grass."

Having dealt with the foreshore plants, we now arrive at the consideration of the third zone—the belt of vegetation densely covering the cliff slopes (where they are not too steep), from base to crest, and extending inland, more or less, into the scrub-land. Here we find trees of low growth, shrubs, and smaller plants, and in it the grey "Coast Tea-tree," *Leptospermum lævigatum*, is so dominant that it impresses its name on the formation as a 'leptospermetum.' Very frequently it grows so thickly, and without admixture of other species, as to make absolutely 'closed communities' within the formation, not even a Pterostylis finding it possible to exist in the dense shade caused by the matted foliage. The other tree forms, usually more robust and rather taller, are the "White" or "Coast Banksia," *B. integrifolia*: the "Drooping Sheoak," *Casuarina quadrivalvis*, perhaps the most graceful of the Victorian species; the "Cypress Ballart," *Exocarpus cupressiformis*, rather infrequently; and the "Manna Gum," *Eucalyptus viminalis*, which far outnumbers the two other eucalypts occasionally noticed further inland; *E. Gunnii*, var. *acervula*, and *E. amygdalina*. Of lower growth, constituting a second stratum are the "Boobialla," *Myoporum insulare*, which, with its fellow, *M. viscosum*, sometimes overhangs the sand; the sprawling "Coast Acacia," *A. longifolia*, var. *sophoræ*: two Styphelias, *S. Richei* and *S. australis*; the "Tonga-bean wood," or "Sea Box," *Alyxia buxifolia*; the shrubby *Goodenia ovata*, sometimes called the "Pipeclay Bush"; only rarely the "White Correa," *C. alba*, and a couple of grey shrubby composites, the "Twiggy Aster," *Aster ramulosus*, and the "Coast Aster," *A. axillaris*.

Though not taking any part in giving character to the 'leptospermetum,' the "White Velvet-bush," *Lasiopetalum Baueri*, may be mentioned as growing only in the vicinity of the Red Bluff, just below the brow of the cliff, and a clump of *Oxylobium ellipticum*, the "Golden Shaggy Pea," at the back of the Ebden estate. In addition to the Tetragona and

Rhagodia already mentioned as finding support among the plants of the "leptospermetum," and rising to the height of a few feet only ("semi-lianes" or "scramblers"), three other lianes are often seen mixed with the foliage of the highest shrubs. The "Large" or "Black Dodder laurel," *Cassytha melantha*, and the "Climbing Lignum" or "Macquarie Harbour Vine," *Muehlenbeckia adpressa*, are 'twiners,' and the "Coast Clematis," *C. microphylla*, a 'leaf climber.'

Thickly covering the ground where the larger 'sclerophyllous' plants are not too densely set and the sun can freely penetrate, is a third story or stratum of, mostly, softer herbs, among which are many orchids. Some of these have been referred to as encroaching on the beach below, but, among many others, perhaps the most prevalent are the "Hairy Crane's-bill," *Geranium pilosum*; the "Nodding Saltbush," *Rhagodia nutans*; the "Ground" or "Cranberry," *Styphelia humifusa*; the "Common Pennywort," *Hydrocotyle vulgaris*; the "Rayed Carrot," *Daucus brachiatus*; the "Tall Daisy," *Brachycome diversifolia*; *Millotia tenuifolia*; the "Kidney Weed," *Dichondra repens*; the "Pellitory," *Parietaria debilis*; and the "Common Green Buttons," *Cotula australis*. Of a still lower growth are such minute plants as *Hydrocotyle callicarpa*, the Leeuwenhoekias, and *Mitrasacme paradoxa*. Not the least charm about the Sandringham flora lies in the profusion of orchids contained in it, and probably no other locality in the State presents such a variety and abundance of species. Over 63 per cent. of the terrestrial species have been reported, and 17 genera out of 21 are represented. Among 20 species of Pterostylis, only two are absent, and, with one or two exceptions, all of these prefer the shelter of the "leptospermetum," where the milder temperature, still air, and soft, moist sand seem to provide conditions peculiarly favourable to the growth of these tender herbs. Even when no orchids are in flower the eye cannot fail to be attracted by the hosts of heart-shaped leaves close pressed to the ground, those with purple underpage indicating the "Mosquito Orchid," *Cyrtostylis reniformis*; others, smaller and equally green on both sides, the "Gnat Orchid," *Acianthus exsertus*; larger still, and coarser, the "Flower of Sadness," *Lyperanthus nigricans*; and again, in deep shade, the green shields of the "Red Helmet," *Corysanthes pruinosa*. Numberless rosettes show the presence of the various species of Pterostylis, and single long hairy leaves mark the spots where the tubers of the Caladenias are gathering their forces so as to be able to send up their delightful blossoms at the fitting time.

Returning now to the consideration of what is popularly known as the heath country, already referred to as "sclerophyllous scrub," or *maqui*, it will be appropriate to mention

first, among the dominant plants, responsible for the general physiognomy of the formation, those which are also most characteristic of this and of similar formations. They are the "Stunted Sheoak," *Casuarina distyla*; the "Pink Tea-tree," *Leptospermum myrsinoides*: the "Wedding Bush," *Ricinocarpus pinifolius*; the "Common Correa," *C. speciosa*; a stunted form of *Banksia marginata*; several of the Leguminosæ, the absence of which is so noticeable in the "leptospermetum," except where it commences to merge into the wider formation, the "Hairy Aotus," *A. villosa*; the "Grey Bossiæa," *B. cinerea*; three of the handsome Dillwynias—the "Heathy Parrot-pea," *D. ericifolia*, "Crowded Parrot-pea," *D. floribunda*, and "Grey Parrot-pea," *D. cinerascens*: three Acacias—the "Juniper Wattle," *A. juniperina*, the pale, early-flowering "Sweet Wattle," *A. suaveolens*, and the "Spike Acacia," *A. oxycedrus*; the lovely white "Common Heath," *Epacris impressa*; the "Prickly Geebung," *Persoonia juniperina*; the "Furze Hakea," *H. ulicina*; and the "Common Bracken," *Pteris aquilina*. Others frequently met are the "Manuka," *Leptospermum scoparium*; the "Honey-bags," *Styphelia scoparia*; where the ground is more continuously moist, *Sprengelia incarnata*: the "Swamp Paper-bark," *Melaleuca ericifolia*: and the "Scented Paper-bark," *M. squarrosa*, all growing in close communities; and the "Gorse Bitter-pea," *Daviesia ulicina*.

Among the plants of lower growth, and hence sub-dominant, the charming little "Twiggy Heath," *Styphelia virgata*; the three Hibbertias—the "Silky Guinea-flower," *H. densiflora*, the "Rigid," *H. stricta*, and the "Bundled Guinea-flower," *H. fasciculata*: the two Pimeleas—the "Downy Rice-flower," *P. octophylla* and *P. phylicoides*; the "Broom Spurge," *Amperea spartioides*: the "Horny Cone-bush," *Isopogon ceratophyllus*; the "Short Purple-flag," *Patersonia glauca*: and the "Faded Rope-rush," *Calostrophus* (*Hypolæna*) *fastigiatus*, from their very frequency, play no small part in building up the character of the vegetation

Of the subordinate second story, softer plants, the most common, perhaps, are the lilies—the "Blue Squill," *Chamæscilla corymbosa*: the "Milkmaids," *Burchardia umbellata*, and the "Nodding Silverweed," *Bartlingia sessiliflora*. Most frequent among others are the "Yam," or "Murrnong," *Microseris Forsteri*; the "Running Postman," *Kennedya prostrata*; the "Bending Golden-hands," *Goodenia geniculata*; the "Billy Buttons," *Craspedia Richea*: *Helichrysum scorpioides*, *Leptorrhynchos squameus*, and the "Blue-bell," *Wahlenbergia gracilis*. Climbers are not many, and two Cassythas, the "Tangled" and the "Downy Dodder-laurels," *C. glabella* and *C. pubescens*;

the "Climbing Sundew," *Drosera Menziesii*; the "Love Creeper," *Comesperma volubile*; and the "Twining Fringe-lily," *Thysanotus Patersoni*, are those most often noticed.

The orchids found here are mostly of genera not represented in the 'leptospermetum'—Thelymitra, Diuris, Prasophyllum, Eriochilus, Microtis, &c. The "Spider Orchid," *Caladenia Patersoni*, is equally at home in both places. The "Tiny" and the "Bearded Helmet-orchid," *Pterostylis parviflora* and *P. barbata*, are seeemingly the only ones of the genus preferring the scrub-land. The "Yellow Hood-orchid," *Thelymitra antennifera*; the "Larger Glossodia," *G. major*; the "Flower of Sadness," *Lyperanthus nigricans*: the "Tall Leek-orchid," *Prasophyllum elatum*; and a couple of the Diuris, are the most abundant. The only grass conspicuous is the "Fibrous Spear-grass," *Stipa semibarbata*, which may be seen waving its plumes well above the shrubs. The formation is too close for grasses, but the "Kangaroo Grass," *Anthistiria ciliata*, and others, occur here and there in favourable situations. Ferns, too, apart from the bracken, are rarely met with, the "Screw Fern," *Lindsaya linearis*, alone prevailing widely.

On account of the sandy, porous nature of the substratum, there are few places where permanent water is found. Still, there are many localities where it persists during a great portion of the year, and where the soil never becomes quite dry Here may be studied examples incompletely representing the various formations of water-loving plants — 'hydrophytes' and 'helophytes,' or marsh plants, and many of their adaptations, such as creeping axes, slenderness of stem, lengthening of internodes, deficiency of root formation, and peculiarity of leaf shape and structure, can be noted.

Of the true aquatic plants, the free-floating "Lesser Duckweed," *Lemna minor* and the 'Red Azolla,' *A. rubra*, alone represent the Pleuston (hydrocharid formation). The fixed water plants (Benthos), constituting what is termed the "Limnæa formation," with leaves submerged or floating, are the "Floating" and "Curly Pond-weed," *Potamogeton natans* and *P. crispus*; *Ottelia ovalifolia*; the yellow-flowered Gentian, *Limnanthemum exaltatum*, oftener seen in blossom after the water has dried up; the "Giant Arrow-grass," *Triglochin procera*, with long, ribbon-like leaves, partly submerged and part floating; the "Water Starwort," *Callitriche verna*; the "Water Milfoil," *Myriophyllum variifolium*, forming "social" growths, often completely filling up a pond, and showing a difference in submerged and emerged leaves; and the beautiful little "Branching Bladderwort," *Utricularia dichotoma*, oftener noticed growing in wet ground.

The plants normally rooting in water or wet soil, but without

submerged leaves — 'helophytes,' or marsh plants—are a much larger company. Many of these possess horizontal rhizomes, as in the little blue-flowered *Isotoma fluviatilis*; the "Brooklime," *Gratiola Peruviana*; the "Swampweed," *Selliera radicans*; the "Small Loose Strife" *Lythrum hyssopifolia*; the common yellow-flowered "Water Buttons," *Cotula coronopifolia*; *Mazus pumilio*; the "Creeping Monkey-flower," *Mimulus repens* (rare); the "White Purslane," *Claytonia australasica*; and the "Joyweed," *Alternanthera triandra*.

The "Common Reed," *Arundo phragmites*, and the "Slender Knotweed," *Polygonum minus*, grow in water. The "River Buttercup," *Ranunculus rivularis*; the "Willow Herb," *Epilobium glabellum*; the tall, leafless "Golden Spray," *Viminaria denudata*; several of the rushes, Junceæ; and even the composites, the "Swamp Daisy," *Brachycome cardiocarpa*, and "Billy Buttons," *Craspedia Richea*, are often seen in flooded ground. The "Dwarf Arrow-grass," *Triglochin centrocarpa*, and the centrolepids, *C. aristata* and *C. strigosa*, the Sundews (Droseras), the "Tender Bubble-plant," *Polypompholyx tenella*, and other minute plants, as the Leeuwenhoekias, "Drummond's Club Moss," *Phylloglossum Drummondi*, the "Curious Mitrewort," *Mitrasacme paradoxa*, and the "Tiny Trigger-plant," *Candollea perpusilla*, are oftenest seen in moist ground. It is difficult, or impossible, to exactly define the formations or associations. There is almost always overlapping between them. Always there are members capable of growing under different conditions, and hence halophytes mix with non-halophytes, the 'leptospermetum' merges into the scrub-land, and the water plants, by way of the marsh plants, into those of the dry land.

In attempting to deal with the subject of this paper in an œcological way, it is felt that, in translating the vegetation into modern terms, only a very moderate success could have been expected. But the effort was certainly worth making. So far, we have almost entirely contented ourselves with the mere enumeration of species noticed, and it would seem to be better if, in future Club excursions, a particular attention were devoted to them in regard to their associations.

A remark by Clements, an American writer quoted by Warming in his "Œcology of Plants," shows that we have not been alone in our neglect of this matter. He says "that vagueness of grouping is due to the fact that œcology is only in its infancy, and that very few detailed investigations of plant communities have been conducted, the published descriptions of vegetation being nearly always one-sided and floristic, as well as very incomplete and unsatisfactory from an œcological standpoint."

An analysis of the 387 plants in the census will show that the numbers contained in the zones described, more or less correspond with their comparative wideness, and that about 6 per cent. belong to the foreshore, 27 per cent. to the leptospermetum, and 67 per cent. to the scrub-land. Further, according to Baron von Mueller's "Second Census," it is found that a great majority of the Sandringham plants have a very wide range, only three—*Leeuwenhoekia Sonderi*, *Thelymitra epipactoides*, and *Pterostylis Mackibbinii*—being endemic to the State; that 112 species extend beyond Australasia (88 of these also to New Zealand), and that about 69 of these, being described from at least two other continents, may fairly be termed "ubiquists." Of those endemic to Australasia, only 43 are set down as occurring in fewer than four States.

It is interesting to note that while 15 per cent. of Australasian plants extend to other countries, and a little more than 3 per cent. only to New Zealand, the proportions in the case of the Sandringham plants are respectively more than 28 per cent. and 22 per cent.

In the compilation of the census the first name is always that occurring in the late Baron Von Mueller's "Key to the System of Victorian Plants," and as there is likelihood of many of the synonyms in "The Flora Australiensis" being adopted subsequently, these have also been added in parentheses. The list is as far as possible complete, names having been taken from several sources, and grateful acknowledgment for suggestions and revision of the lists is here made to several members of the Club, and more particularly to Messrs. P. R. H. St. John and C. French, jun., whose familiarity with the district is so well known.

CENSUS OF SANDRINGHAM FLORA.

h indicates plants found on the foreshore; *l*, those of the "leptospermetum;" *s*, of the scrub-land; *a*, aquatic plants and those in wet ground; *, plants rarely met with.

DILLENIACEÆ—
- *s* Hibbertia densiflora, F. v. M. (H. sericea, Benth.)
- *s* ,, stricta, R. Br.
- *s* ,, acicularis, F. v. M.
- *s* ,, fasciculata, R. Br.

RANUNCULACEÆ—
- *l* Clematis microphylla, D.C.
- *a* Ranunculus rivularis, B. & S.
- *s* ,, lappaceus, Sm.

LAURACEÆ—
- *s* Cassytha glabella, R. Br.
- *s* ,, pubescens, R. Br.
- *s l* ,, melantha, R. Br.

CRUCIFERÆ—
- *l* Stenopetalum lineare, R. Br.
- *s* Lepidium ruderale, L.
- *h* Cakile maritima, Scop.

VIOLACEÆ—
- *s* Viola hederacea, Labill.
- *s* ,, ,, var. Sieberiana

PITTOSPOREÆ—
- *l* Bursaria spinosa, Cav.
- *l* Billardiera scandens, Sm.

DROSERACEÆ—
- *s* Drosera glanduligera, Lehm.
- *s* ,, pygmæa, D. C.
- *s* ,, spathulata, Labill.
- *a* ,, binata, Labill.
- *s* ,, Whittakeri, Planch.
- *s* ,, auriculata, Back.
- *s* ,, peltata, Sm.
- *s* ,, Menziesii, R. Br.

HYPERICINEÆ—
s Hypericum japonicum, Thunb.
POLYGALEÆ—
s Comesperma volubile, Labill.
s ,, ericinum, D. C.
s ,, calymega, Lab.
TREMANDREÆ—
s Tetratheca ciliata, Lindl.
RUTACEÆ—
**s* Boronia parviflora, Sm.
**l* Correa alba, Andr.
s ,, speciosa, Andr.
LINACEÆ—
s Linum marginale, Cunn.
GERANIACEÆ—
l Geranium Carolinianum, L. (G. dissectum, L.)
s Erodium cygnorum, Nees.
s Pelargonium australe, Willd.
s l Oxalis corniculata, L.
STERCULIACEÆ—
**l* Lasiopetalum Baueri, Steetz.
EUPHORBIACEÆ—
*s***l* Poranthera ericoides, Klotzsch.
s l ,, microphylla, Brong.
s Ricinocarpus pinifolius, Desf.
s Amperea spartioides, Brong.
URTICACEÆ—
l Parietaria debilis, G. Forst.
CASUARINEÆ—
s l Casuarina quadrivalvis, Lab. (C. stricta, Ait.)
s ,, suberosa, O. & D.
s ,, distyla, Vent.
STACKHOUSIEÆ—
s Stackhousia linarifolia, Cunn. (monogyna, Lab.)
**h* ,, spathulata, Sieb.
FRANKENIACEÆ—
h Frankenia lævis, L. (F. pauciflora, D. C.)
PORTULACEÆ—
h Portulaca oleracea, L.
l s Claytonia calyptrata, F. v. M. (Calandrinia calyptrata, Hook.)
a ,, australasica, Hook. f.
CARYOPHYLLEÆ—
l Stellaria pungens, Brong.
l Spergularia rubra, Presl.
l Polycarpon tetraphyllum, Loef.
AMARANTACEÆ—
a Alternanthera triandra, Lam. (A. nodiflora, R. Br.)
h Polycnemum (Hemichroa) pentandrum, F. v. M.
SALSOLACEÆ—
h Atriplex crystallinum, Hook. f.
h ,, cinereum, Poiret.
l Rhagodia Billardieri, R. Br.
h ,, hastata, R. Br.
l ,, nutans, R. Br.
h l Chenopodium album, L.
l ,, murale, L.
h l ,, glaucum, L.
l Enchylæna tomentosa, R. Br.
h Salicornia australis, Sol.
h s ,, arbuscula, R. Br.
h Suæda maritima, Dumort.
h Salsola kali, L.
FICOIDEÆ—
l Mesembryanthemum æquilaterale, Haworth, and var. album
l h Mesembryanthemum australe, Sol.
h Tetragona expansa, Murray.
l ,, implexicoma, Hook. f.
POLYGONACEÆ—
a Polygonum minus, Hudson.
l Muehlenbeckia adpressa, Meissn.
THYMELEÆ—
s Pimelea glauca, R. Br.
s ,, humilis, R. Br.
s ,, octophylla, R. Br.
s ,, phylicoides, Meiss.
LEGUMINOSÆ—
* Oxylobium ellipticum, R. Br.
s Gompholobium Huegelii, Benth.
s Sphærolobium vimineum, Sm.
a Viminaria denudata, Sm.
s Daviesia ulicina, Sm.
s Aotus villosa, Sm.
s Pultenæa paleacea, Willd.
s ,, dentata, Lab.
**s* ,, tenuifolia, R. Br.
s Dillwynia ericifolia, Sm.
s ,, floribunda, Sm.
s ,, cinerascens, R. Br.
s Platylobium obtusangulum, H.
s Bossiæa cinerea, R. Br.
s ,, prostrata, R. Br.
s Hovea heterophylla, Cunn.
s Indigofera australis, Willd.
s Kennedya prostrata, R. Br.
s ,, monophylla, Vent. (Hardenbergia monophylla, Benth.)
s Acacia juniperina, Willd.
s ,, armata, R. Br.
s ,, acinacea, Lindl.
**s* ,, retinodes, Schlech.
s ,, suaveolens, Willd.
s ,, melanoxylon, R. Br.
s ,, oxycedrus, Sieb.
s ,, verticillata, Willd.
s l ,, longifolia, Willd., var. sophoræ

l Acacia decurrens ,Willd
s l ,, mollissima, Willd.

ROSACEÆ—
s Rubus parvifolius, L.
s l Acæna ovina, Cunn.
s l ,, sanguisorbæ, Vahl.

CRASSULACEÆ—
l Tillæa macrantha, Hook. f.
* ,, purpurata, Hook.

ONAGREÆ—
a Epilobium tetragonum, L. (E. glabellum, Forst.)

SALICARIEÆ—
s a Lythrum hyssopifolia, L.

HALORAGEÆ—
s Haloragis micrantha, R. Br.
s ,, tetragyna, R. Br.
a Myriophyllum variifolium, H.

CALLITRICHINÆ—
a Callitriche verna, L.

MYRTACEÆ—
l Leptospermum lævigatum, F. v. M.
s ,, scoparium, R. and G. Forster.
s ,, myrsinoides, Sch.
**s* Kunzea peduncularis, F. v. M.
sa Melaleuca squarrosa, Donn.
s a ,, ericifolia, Sm.
s l Eucalyptus pauciflora, Sieber (coriacea, A. Cunn.)
s l ,, amygdalina, Lab.
s l ,, viminalis, Lab.
s l ,, Gunnii, var. acervula, Hook.

UMBELLIFERÆ—
s l Hydrocotyle vulgaris, L.
s ,, laxiflora, D. C.
l s ,, callicarpa, Bunge.
s Didiscus pilosus, Benth. (Trachymene australis, Benth.)
s Trachymene heterophylla, F. v. M. (Siebera heterophylla, Benth.)
s Xanthosia pusilla, Bunge.
a Eryngium vesiculosum, Lab.
h Apium prostratum, Lab. (A. australe, Thou.)
l Daucus brachiatus, Sieb.

SANTALACEÆ—
s l Exocarpus cupressiformis, Lab.
s l ,, stricta, R. Br.

LORANTHACEÆ—
s l Loranthus celastroides, Sieb.
l ,, pendulus, Sieber

PROTEACEÆ—
s Isopogon ceratophyllus, R. Br.
s Persoonia juniperina, Lab.
s Hakea nodosa, R. Br.
s ,, ulicina, R. Br.
s Banksia marginata, Cav.
s l ,, integrifolia, L.

RUBIACEÆ—
s Opercularia varia, Hook. f.
**s* ,, ovata, Hook f.
l s Asperula oligantha, F. v. M.

COMPOSITÆ—
l s Lagenophora Billardieri, Cass.
l s Brachycome diversifolia, Fisch.
s l ,, graminea, F. v. M.
s ,, decipiens, Hook. f.
a ,, cardiocarpa, F. v. M.
l Aster axillaris, F. v. M. (Olearia axillaris, F. v. M.)
s l ,, ramulosus, Lab. (Olearia ramulosa, Benth.)
s Vittadinia australis, A. Rich.
l s Stuartina Muelleri, Sond.
l s Gnaphalium luteo-album, L.
l s ,, japonicum, Thun.
* ,, indutum, Hook. f.
s Podolepis acuminata, R. Br.
s Leptorrhynchos squamatus, Less.
s ,, tenuifolius, F. v. M.
s Helipterum dimorpholepis, Benth.
s Helichrysum scorpioides, Lab.
s ,, lucidum, Henck. (H. bracteatum, Willd.)
s ,, apiculatum, D. C.
s ,, semipapposum, D.C.
l ,, cinereum, F. v. M.
l Cassinia aculeata, R. Br.
s l Rutidosis Pumilo, Benth.
l Millotia tenuifolia, Cass.
* Angianthus Preissianus, Benth. (A. eriocephalus, Benth.)
h Calocephalus Brownii, F. v. M.
s Craspedia Richea, Cass.
* Cotula filifolia, Thunb.
l a ,, coronopifolia, L.
l ,, australis, Hook. f.
l ,, reptans, Benth.
a Centipeda Cunninghami, F. v. M.
l Senecio lautus, Soland.
s Erechtites arguta, D. C.
s ,, quadridentata, D. C.
s Cymbonotus Lawsonianus, Gaud.
s Microseris Forsteri, Hook. f.

CAMPANULACEÆ—
s l Lobelia anceps, Thunb.

s Lobelia pratioides, Benth.
a Isotoma fluviatilis, F. v. M.
s Wahlenbergia gracilis, D. C.

CANDOLLEACEÆ—
s Candollea serrulata, Lab. (Stylidium graminifolium, Swartz)
a ,, perpusilla, F. v. M. (Stylidum perpussillum, Hook. f.)
l s Leeuwenhoekia dubia, Sonder.
l s ,, Sonderi, F. v. M.

GOODENIACEÆ—
s Brunonia australis, Sm.
a Selliera radicans, Cav.
l Goodenia ovata, Sm.
s ,, geniculata, R. Br.
**s* ,, elongata, Lab
s ,, pinnatifida, Sch.
s ,, humilis, R. Br.

GENTIANEÆ—
a Limnanthemum exaltatum, F. v. M. (Villarsia reniformis, R. Br.)
**s* Sebæa albidiflora, F. v. M.
**s* ,, ovata, R. Br.
s Erythræa australis, R. Br.

LOGANIACEÆ—
l s Mitrasacme paradoxa, R. Br.

PLANTAGINEÆ—
s Plantago varia, R. Br.

PRIMULACEÆ—
a h Samolus repens, Pers.

APOCYNEÆ—
l Alyxia buxifolia, R. Br.

CONVOLVULACEÆ—
s Convolvulus erubescens, Sims.
s l Dichondra repens, R. and G. Forster.
a h Wilsonia rotundifolia, Hook.
a ,, Backhousii, Hook.

SOLANACEÆ—
s l Solanum nigrum, L.
s l ,, aviculare, Forst.

SCROPHULARINEÆ—
**a* Mimulus repens, R. Br.
**a* Mazus pumilio, R. Br.
a Gratiola Peruviana, L.
s Veronica gracilis, R. Br.
s Euphrasia Brownii, F. v. M. (collina, R. Br.)

LENTIBULARINÆ—
**a* Utricularia lateriflora, R. Br.
a ,, dichotoma, Lab.
a Polypompholyx tenella, Lehm.

LABIATÆ—
s Brunella vulgaris, L. (Prunella vulgaris, D. C.)
s Ajuga australis, R. Br.

MYOPORINEÆ—
l Myoporum insulare, R. Br. (M. serratum, R. Br.)
l ,, viscosum, R. Br. (M. serratum, var. glandulosum, Benth.)
**a* ,, humile, R. Br. (M. parvifolium, R. Br.)

ASPERIFOLIÆ—
s l Cynoglossum suaveolens, R. Br.
s l Myosotis australis, R. Br.

EPACRIDEÆ—
s l Styphelia humifusa, Pers. (Astroloma humifusum, R. Br.)
l ,, Richei, Lab. (Leucopogon Richei, R. Br.)
l ,, australis, F. v. M. (Leucopogon australis, R. Br.)
s ,, virgata, Lab. (Leucopogon virgatus, R. Br.)
l s ,, serrulata, Lab. (Acrotriche serrulata, R. Br.)
s ,, scoparia, Sm. (Monotoca scoparia, R. Br.)
**s* Brachyloma ciliatum, Benth.
s Epacris impressa, Lab.
a s ,, obtusifolia, Sm.
a s Sprengelia incarnata, Sm.

ORCHIDEÆ—
l Dipodium punctatum, R. Br.
* Spiranthes australis, Lindl.
**s* Thelymitra ixioides, Swartz
**s* ,, aristata, Lindl.
**s* ,, epipactoides, F. v. M.
s ,, longifolia, R. and G. Forster.
l ,, carnea, R. Br.
s ,, flexuosa, Endl.
s ,, antennifera, Hook. f.
s Diuris maculata, Sm.
s ,, pedunculata, R. Br.
s ,, sulphurea, R. Br.
s ,, longifolia, R. Br.
*s** Orthoceras strictum, R. Br.
s Cryptostylis longifolia, R. Br.
s Prasophyllum elatum, R. Br.
s ,, patens, R. Br.
s ,, fuscum, R. Br.
**s* ,, nigricans, R. Br.
**s* ,, Archeri, Hook. f.
* ,, intricatum, C. Stuart

s Microtis porrifolia, R. Br.
s ,, atrata, Lindl.
**l* Corysanthes unguiculata, R. Br.
l ,, pruinosa, R. Cunn. (C. fimbriata, R. Br.)
**s* Caleya (Caleyana) major, R. Br.
l Acianthus exsertus, R. Br.
l Cyrtostylis reniformis, R. Br.
l Pterostylis concinna, R. Br.
l ,, curta, R. Br.
* ,, Mackibbinii, F.v.M.
l ,, acuminata, R. Br.
l ,, nutans, R. Br.
l ,, pedaloglossa, Fitz.
l ,, pedunculata, R. Br.
l ,, nana, R. Br.
l ,, cucullata, R. Br.
l ,, grandiflora, R. Br.
* ,, reflexa, R. Br.
l ,, præcox, Lindl.
l ,, obtusa, R. Br.
s ,, parviflora, R. Br.
**s* ,, barbata, Lindl.
**s* ,, mutica, R. Brown
l ,, longifolia, R. Br.
l ,, vittata, Lindl.
l s Lyperanthus nigricans, R. Br.
s Eriochilus autumnalis, R. Br.
s ,, fimbriatus, F. v. M. (Caladenia fimbriata, Reich.)
s Caladenia Menziesii, R. Br.
l s ,, Patersoni, R. Br.
l ,, latifolia, R. Br.
s ,, suaveolens, Reich.
l s ,, carnea, R. Br.
**s* ,, cœrulea, R. Br.
s ,, deformis, R. Br.
l s Glossodia major, R. Br.

IRIDEÆ—
s Patersonia glauca, R. Br.
s ,, longiscapa, Sweet.

HYDROCHARIDEÆ—
a Ottelia ovalifolia, Rich.

AMARYLLIDEÆ—
s Hypoxis glabella, R. Br.
a ,, hygrometrica, Lab.

LILIACEÆ—
l Dianella revoluta, R. Br.
s Wurmbea dioica, F. v. M. (Anguillaria dioica, R. Br.)
s Burchardia umbellata, R. Br.
s Bulbine bulbosa, Haworth.
s Thysanotus Patersoni, R. Br.
s Cæsia vittata, R. Br.
s ,, parviflora, R. Br.
s Chamæscilla corymbosa, F.v.M.
s Tricoryne elatior, R. Br.
s Stypandra cæspitosa, R. Br.
s Arthropodium strictum, R. Br. (Dichopogon strictus, Baker)
s Bartlingia sessiliflora, F. v. M. (Laxmannia sessiliflora, Dene.)
s Xerotes longifolia, R. Br.
s ,, Brownii, F. v. M. (X. multiflora, R. Br.)
s ,, Thunbergii, F. v. M. (X. filiformis, R. Br.)
s Xanthorrhœa minor, R. Br.

LEMNACEÆ—
a Lemna minor, L.

NAIADACEÆ—
a Potamogeton natans, L.
**a* ,, crispus, L.
a ,, pectinatus, L.
a Triglochin striata, R. and P.
a ,, procera, R. Br.
**a* ,, centrocarpa, Hook.

PHILHYDREÆ—
**a* Philhydrum lanuginosum, Banks

XYRIDEÆ—
**a* Xyris gracilis, R. Br.

JUNCEÆ—
s Luzula campestris, D. C.
s Juncus planifolius, R. Br.
a ,, bufonius, L.
a ,, communis, E. Meyer
a ,, pauciflorus, R. Br.
a ,, prismatocarpus, R. Br.
s ,, capitatus, Weigel.

CENTROLEPIDEÆ—
s Aphelia gracilis, Sonder.
a Centrolepis aristata, R. and S.
a ,, strigosa, R. and S.
**a* ,, polygyna, Hieron

RESTIACEÆ—
s Calostrophus fastigiatus, F. v. M. (Hypolæna fastigiata, R. Br.)
,, lateriflorus, F. v. M. (Hypolæna lateriflora, Benth.)

CYPERACEÆ—
s Cyperus tenellus, L.
a Scirpus arenarius, Benth.
s l ,, nodosus, Rottb.
a Schœnus nitens, Poiret
s ,, brevifolius, R. Br.
s ,, apogon, R. and S.
s Lepidosperma longitudinale, Lab.
s ,, gladiatum, Lab.

s Cladium schœnoides, R. Br.
h Carex pumila, Thunb.

GRAMINEÆ—
s Panicum crusgalli, L.
h Spinifex hirsutus, Lab.
h Lepturus incurvatus, Trin.
h ,, cylindricus, Trin.
s Anthistiria ciliata, L.
s l Dichelachne crinita, Hook. f.
l Stipa teretifolia, Steud.
s ,, semibarbata, R. Br.
s Sporobolus indicus, R. Br.
l Agrostis solandri, F. v. M. (Deyeuxia Forsteri, Kunth.)
s ,, (Deyeuxia) quadriseta, R. Br.
s Deyeuxia minor, Benth.
s Danthonia penicillata, F. v. M.
l Cynodon dactylon, L. C. Rich. (Pers.)
h Chloris truncata, R. Br.
l Poa billardieri, Steud.
h Festuca littoralis, Lab. (Schedonorus littoralis, Beauv.)
h Distichlis maritima, Rafin.
h Bromus arenarius, Lab.
s Agropyrum scabrum, Pal.
a Arundo phragmites, Do. (Phragmites communis, Trin.)

RHIZOSPERMÆ—
a Azolla filiculoides, Lamarck (A. rubra, R. Br.)

LYCOPODINEÆ—
**s* Lycopodium laterale, R. Br.
Selaginella uliginosa, Spring.
a Phylloglossum Drummondii, Kunz.

FILICES—
s l Ophioglossum vulgatum, L.
**s* Botrychium lunaria, Swartz.
**s* Schizæa fistulosa, Lab.
s ,, dichotoma, Sw. (S. bifida, Willd.)
**s* Gleichenia circinata, Swartz
s Lindsaya linearis, Swartz.
s Adiantum æthiopicum, L.
s Pteris aquilina, L.

THE LATE MR. O. A. SAYCE, A.L.S.—Just as we are going to press the sad announcement has been made of the death, after only a few days' illness, of Mr. O. A. Sayce, who was present at the last meeting of the Club, and received the congratulations of his fellow-members on his new appointment, mentioned in the April *Naturalist*. Time has not allowed for an adequate record in this issue of Mr. Sayce's work on behalf of natural science—this will appear next month.

EUPHORBIA JUICE AS A CAUSTIC. — Mr. M'Fadzean, dairy supervisor, Department of Agriculture, recently forwarded to the Herbarium a specimen of a plant, *Euphorbia peplus*, L., with the statement that a resident of Hawthorn had a small growth on his cheek below the eye, which, under medical advice, he was about to have removed by operation. He was, however, advised to try the effects of a daily application of the milky juice of this weed. Under this treatment the surface of the growth gradually peeled off, and in some three weeks the sore was healed, leaving only a slight and barely perceptible scar. There seems to be no reason to doubt this observation, which is well authenticated, and the milky juice of many species of Euphorbia has a strong action on the skin when applied to it one or more times. Hence, this matter seems worthy of further investigation, preferably by a medical man, to definitely determine its accuracy, and also to what extent so simple a treatment is applicable in similar cases. — ALFRED J. EWART, National Herbarium.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday, 8th May, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

THE LATE MR. O. A. SAYCE, A.L.S.

The president said that, before proceeding to the business on the notice paper, it became his sad duty to refer to the unexpected death of Mr. O. A. Sayce, A.L.S., who had been present at the last monthly meeting and responded so feelingly to the congratulations of the Club on his promotion to an advanced position in scientific work in Adelaide. He said that, by the death of Mr. Sayce, the scientific community had suffered a severe loss, and, deploring the sudden removal of a friend and comrade, and an original member of the Club, he invited members to assent to his motion that a letter of sympathy and condolence be forwarded to Mrs. Sayce and family. Mr. F. G. A. Barnard, as one of Mr. Sayce's oldest friends, briefly supported the motion, and all present rose silently in their places and thus signified their approval of the resolution.

CORRESPONDENCE.

From the Historical Society of Victoria, stating that the sub-committee representing the Historical, Field Naturalists', Royal, and Geographical Societies had reported, with regard to the aboriginal quarries near Lancefield, that at present there was no hope of obtaining the requisite land to secure the permanent preservation of the site at a price within reason.

From the Royal Colonial Institute, London, asking for the *Victorian Naturalist* in exchange for the Institute's publication, *The United Empire*. To be considered by the committee.

REPORTS.

A report of the excursion from Sydenham to Bulla and Diggers' Rest on Eight Hours Day, Monday, 24th April, was given by the leader, Mr. R. W. Armitage, B.Sc., who reported a good attendance of members and a most enjoyable outing. The excursion had been arranged for geology, and in a walk of some twelve miles or so three distinct geological formations—volcanic, granitic, and Ordovician—had been traversed, and a number of interesting observations made.

He also read an interesting botanical report furnished by Dr. Sutton and Mr. P. R. H. St. John.

A report of the junior excursion to the Zoological Gardens on Saturday, 6th May, was, in the absence of the leader, Mr. J. A. Leach, M.Sc., given by Mr. C. Stout, the hon. secretary for juniors, who said that there had been a good attendance of members. The afternoon had been set apart for the study of birds, and the leader had, by means of the numerous kinds on exhibition, been able to point out the chief characteristics of different groups of birds and their systematic arrangement, which had resulted in a very pleasant and instructive afternoon being spent.

ELECTION OF MEMBER.

On a ballot being taken, Mr. J. Firth, Briagolong, was duly elected a country member of the Club.

GENERAL BUSINESS.

Nominations for office-bearers for the year 1911–12 were then made, with the exception of the office of hon. assistant secretary and librarian, for which no nomination was received.

Messrs. D. Best and J. Stickland were elected to audit the accounts for 1910–11.

Mr. Geo. Coghill drew attention to the newspaper report of the proposal, as the result of a report of a sub-committee of the Cabinet, that the position of Government Botanist be abolished, and thus the salary of its occupant would be saved. He said that to take such a step on the score of economy was absurd, and that, in his opinion, Professor Ewart was being penalized for not seeing eye to eye with the Minister for Agriculture on all points. He moved—"That the Field Naturalists' Club of Victoria regrets to hear of the rumoured retirement of Professor Ewart from the position of Government Botanist, and, trusting that the rumour is founded on a misunderstanding, hopes that the present high status of the office will be preserved, and that Professor Ewart may be enabled to continue his work of guidance and instruction in the Department of Agriculture, to the benefit of the various botanical interests of the community, and that the hon. secretary forward copies of this resolution to the Acting Premier and the Minister for Agriculture."

Mr. J. Shephard, in seconding the resolution, said that the Club was well within its rights in commenting on a matter that concerned it so much, and in taking any step which might be necessary to try and prevent any set-back to natural science, such as would result from the retirement of an officer with the qualifications Professor Ewart undoubtedly had.

The motion was carried unanimously.

Mr. J. Shephard referred to the services of Mr. J. Searle

as lanternist on many occasions, and moved a vote of thanks to him. This was supported by Mr. Best, and carried by acclamation.

PAPER READ.

By Mr. J. R. Tovey, entitled "Notes on the Flora of Coode Island."

The author briefly related the history of the island, which was created in 1886 by the cutting of the Coode Canal in order to shorten the distance between the Melbourne wharves and the mouth of the River Yarra. Originally forming part of the area known as the Sandridge Bend, it was covered with tea-tree and other indigenous vegetation, but in course of time this had almost entirely disappeared. Of late years portion of the island had been used as a dumping-ground for ships' ballast brought from foreign ports, and as a consequence the flora was now almost entirely exotic, and it was interesting to note that many of the plants were natives of South Africa.

Some discussion ensued, during which Mr. C. J. Gabriel remarked that a Torres Strait shell had recently been found in Victorian waters, and asked whether the ballast area contained any shells.

Mr. F. Chapman, A.L.S., said the paper was very interesting, and, considered with Mr. Gabriel's remark, threw some light on the distribution of strange rock material found in various places along our shores. Some stone from Sweden had recently been reported, and it would be interesting to see if any species of the Swedish flora would appear.

Mr. A. D. Hardy, F.L.S., said that he remembered examining some ballast near the Yarra, which, he found, had come from Santos, in Brazil, having been brought from that port by a vessel which had called there, but, owing to the prevalence of fever, had received no cargo.

Mr. C. French, jun., remarked that Coode Island offered plenty of opportunities to the pond-life hunter.

Mr. Tovey, in replying to the various speakers, said that the ballast locality contained many shells, probably of foreign origin.

Owing to the lateness of the hour, Mr. Williamson's paper on a visit to East Gippsland was postponed until the next meeting.

NATURAL HISTORY NOTES.

Mr. R. W. Armitage, B.Sc., said that while at the Gippsland Lakes at Easter his attention had been attracted by the number of the Coast Bell-birds, or Bell-Miners, *Manorhina melanophrys*, in the scrub near Kalimna, which were particularly harmonious for the time of year, and appeared to be feeding almost exclusively upon mosquitoes. The birds were also very numerous about the mouth of the Latrobe.

Mr. Armitage also drew attention to the "silt-jetties" rapidly forming at the mouth of the Avon River, and extending some distance into Lake Wellington, indicating that considerable erosion is going on in the valley of the Avon.

Mr. P. R. H. St. John remarked that the Kookaburra, or Laughing Jackass, *Dacelo gigas*, was creating great destruction among the nestling birds in the Melbourne Botanic Gardens, and was not deserving of any protection.

The chairman related an instance of a Magpie-Lark, or Pied Grallina, *Grallina picata*, fighting a supposed rival, being its own image reflected by the window of a cottage.

EXHIBITS.

By Miss Bury.—Thirty species of shells collected at Hampton excursion.

By Miss Cochrane.—The rare orchid *Prasophyllum Archeri*, collected at Mitcham on Easter Monday.

By Mr. J. Cronin, from Botanical Gardens, Melbourne.—Specimens of three May-flowering Australian acacias—viz., *A. discolor*, Willd.; *A. Maidenii*, F. v. M.; and *A. iteaphylla*, F. v. M.; also flowering stems of the "Anchor" plant, *Colletia cruciata*, Gill and Hook., from South America.

By Mr. C. J. Gabriel.—Marine shells from Victorian waters belonging to genus Myodora—viz., *M. ovata*, Rve., *M. brevis*, Sow., *M. pandoriformis*, Stutch, and *M. albida*, T.-Wds.

By Mr. J. G. O'Donoghue.—Fossil shell, *Haliotis nævosoides*, from Barwonian limestone beds, Maude.

By Mr. F. Pitcher.—Specimens of the Gipsy Fern, *Polypodium grammitidis*, R. Br., collected at Lorne, Easter, 1911.

By Mr. J. Stickland.—Specimens of fern, *Asplenium flabellifolium*, from Myers Creek, Healesville, some fronds exceeding two feet in length.

By Mr. P. R. H. St. John.—Dried specimens of *Eucalyptus Bridgesiana*, R. T. Baker, collected by exhibitor near Orbost, December, 1910.

By Mr. J. R. Tovey.—Dried plants from Coode Island, October, 1908:—*Berkheya* (*Stobæa*) *rigida*, Thunb. (Compositæ), *Tetragona fruticosa*, L. (Ficoideæ), *Ursinia chrysanthemoides*, Harv. (Compositæ), and *Zygophyllum sessilifolium*, L. (Zygophyllaceæ); all introduced from South Africa.

After the usual conversazione the meeting terminated.

CORRECTIONS.—In the report of the April meeting, on page 2, "*Gryllotalpa coarcta*" should read "*Gryllotalpa coarctata*." In the note on "Bodies Resembling Australites," the words "are generally conceded to be of volcanic origin" should read "are by some supposed to be of volcanic origin."

THE LATE MR. O. A. SAYCE, A.L.S.

Octavius Albert Sayce, whose death was announced in the last *Naturalist*, was educated at the Scotch College, Melbourne. On leaving school he entered a softgoods warehouse, where in due course he was entrusted with some of the town travelling. About this time he became interested in the application of the microscope, with the result that this instrument henceforth became his hobby. Evidently of a scientific turn of mind, he entered on a course of practical chemistry, devoting special attention to ferments, and later set up as a manufacturer on a small scale ; but his efforts did not bring sufficient reward, and he became country traveller for Rocke, Tompsitt and Co., wholesale chemists, with whom he remained many years, becoming town traveller, and making many friends among the pharmaceutical chemists of the metropolis. Though offered inside work of a more responsible kind, his somewhat delicate health compelled him to live an outdoor life as much as possible. While in this employ he applied his knowledge of microscopy to the examination of various pathological specimens for medical men, which led him to the study of bacteria and other allied forms. In this, as in other branches of science, he became an adept, and as a result obtained a position on the University staff.

He was an original member of the Field Naturalists' Club, having been elected in May, 1880. He was a member of committee in 1886–7, and librarian in 1887–8. His frequent absence from town prevented him from taking an active part in Club affairs for some years, but in 1895 he was again elected librarian, and held that office for six years. In the years 1901–2 and 1902–3 he was one of the vice-presidents, and during 1903–5 held the position of president.

As a field naturalist he took up entomology, and was first attracted by the Coleoptera. He was, however, a keen experimenter, and, recognizing that microscopy (which he had studied some years before) was his *forte*, became a remarkably expert manipulator. His knowledge of chemistry gave him a great advantage in the use of stains, and he attained a thorough knowledge of these, both theoretical and practical—a knowledge that afterwards stood him in good stead.

A course of practical biology, under the Rev. W. Fielder, opened a new world to him, and he soon rivalled his master in technique. Then followed several years of steady work with the scalpel and microtome. A pleasing incident may be related. He sent a copy of his first important histological paper, on Gryllotalpa, to a well-known English biologist, who at once recognized the ability of the author. The acknowledgment

(conveyed on a post-card) was curt but inspiring—"Good. Go on.—G. B. H." Sayce never forgot these words.

Some ten years ago he turned his attention to the Crustacea, and became a recognized authority on the smaller forms, and published a number of papers, especially in the "Proceedings of the Royal Society of Victoria."

He took an active part in the formation of the Hawthorn and Camberwell Microscopical Society, and appears to have been permanent president. Here, as in every other sphere in which he was engaged, his wide knowledge was freely placed at the disposal of any who wanted it.

In 1906 Mr. Sayce was appointed Demonstrator and Assistant Lecturer in Bacteriology in the University, and, though he found time to publish his important papers on Koonunga, which represented a new family of Anaspidæ, the heavy calls of his new work turned his thoughts into other channels, and led to the publication of a few brief papers on bacteriological questions in the *Australian Medical Journal*, and he is understood to have recently sent an important paper on an obscure disease of children to an English journal, but at the time of writing nothing further is known of the article.

Last year the Linnean Society of London elected him as one of its associates, in recognition of his valuable research work. This distinction, it may be remarked, is limited in the number of holders, and was entirely unsought.

Early in April Mr. Sayce was appointed first Director of the Bacteriological Institute of South Australia, just established, but did not live to take up his new duties. After only a few days' illness he died of pneumonia, at the age of 49, on the 29th April, the very day he had intended being in Adelaide, and was laid to rest on 1st May, the day he was to have taken up his fresh responsibilities. He has left a wife and three children to battle with the world bereft of a father's help.

The outstanding feature of Mr. Sayce's character was his unfaltering honesty. He never posed. He worked hard and continuously, as his list of papers will in part show; but, besides publishing, he spent a large amount of time and energy in guiding the scientific work of others, and many of those interested in microscopic work in Melbourne owe a great deal to his voluntary aid.

All who knew him were his friends, and they will miss his ready jests and his resourceful help, while the Field Naturalists' Club has lost one of its ablest supporters, always ready to smooth away difficulties, to adjust mutual misunderstandings, or to suggest fresh fields of work. Few men pass away so sincerely loved, so deeply mourned. H.

LIST OF PAPERS, &c., BY MR. O. A. SAYCE, A.L.S.

IN THE "VICTORIAN NATURALIST."

"Remarks on Gall-making Coccidæ," vol. ii. (1885), p. 99.

Lecturette—"The Fertilization of Flowers" (abstract), iv. (1887), p. 28.

"Formalin as a General Preservative for Animal and Vegetable Structures," xii. (1895), p. 101.

Lecturette—"How an Insect Lives" (abstract), xvi. (1899), p. 20.

"Notes on an Exhibit of Living Stages of a Mycetozoa," xvi. (1889), p. 80.

"Some Peculiar Habits of Crabs," xvii. (1900), p. 74.

"A Method of Preserving Crustacea," xvii. (1900), p. 75.

"On the Crustacean, *Phreatoicus australis*, Chilton, from Tasmania," xvii. (1900), p. 108.

"Report on Freshwater Crustaceans from Buffalo Mountains Camp-out," xx. (1904), p. 146.

Presidential address—"The Collecting of Natural History Specimens," xxi. (1904), p. 35.

"Description of a Common Shore Crustacean" (abstract), xxi. (1905), 146.

"Report of Demonstration on Shore-life at Mornington Camp-out," xxiii. (1907), 219.

Lecture—"Port Phillip Invertebrates and their Inland Relations" (abstract), (delivered at Mornington Camp-out), xxiii. (1907), 220.

"Description of a New Remarkable Crustacean with Primitive Malacostracian Characters," xxiv. (1907), 117. (Reprinted in *Annals and Magazine of Natural History*, series 8, vol. i., 1908.)

IN THE "PROCEEDINGS OF THE ROYAL SOCIETY OF VICTORIA."

1. "On the Structure of the Alimentary System of *Gryllotalpa australis* (Ericks.), with Some Physiological Notes," vol. ii., 1899.

2. "Phreatoicoides: a New Genus of Freshwater Isopoda," vol. xii., 1900.

3. "*Niphargus pulchellus*: a New Victorian Blind Amphipod," *ib.*

4. "*Phreatoicus shephardi*: a New Genus of Freshwater Isopoda from Victoria," vol. xiii., 1900.

5. "Janirella: a New Genus of Isopoda from Fresh Water, Victoria," *ib.*

6. "Description of Some New Victorian Freshwater Amphipoda," *ib.*

7. "A New Genus of Phreatoicidæ," vol. xiv., 1902.

8. "Description of Some New Victorian Freshwater Amphipoda," vol. xv., 1902.

9. "The Phyllopoda of Australia, including Descriptions of New Genera and Species," vol. xv., 1903.

10. "Description of two Terrestrial Species of Talitridæ from Victoria," vol. xxii., 1909.

IN "TRANSACTIONS OF THE LINNEAN SOCIETY OF LONDON."

"On *Koonunga cursor*, a Remarkable New Type of Malacostracous Crustaceans," vol. xi., 1908.

Mr. Sayce also published several bacteriological papers in the *Australian Medical Journal*.

FINE YIELD OF PALINGS.—At Barramunga, in the Otway Forest, a splitter recently obtained 7,600 6-feet palings from a single Mountain Ash, *Eucalyptus regnans*. From one length 700 palings were split.

EXCURSION TO MONT ALBERT AND BALWYN.

The assemblage at Mont Albert station on Saturday afternoon, 8th April, consisted of 17 members and visitors, and we were favoured by an especially fine afternoon and a clear atmosphere—the latter a desirable condition where scenery is the objective. For a demonstration in physiography and general geology, the facilities afforded in this district from the various view-points can scarcely be surpassed. From the Reservoir Hill (420 feet) a magnificent panorama is displayed, and it was here that the first halt was made. To the south-east and south the lower slopes of the great Yarra or Nillumbik pene-plain were seen, merging into the coastal plain beyond Oakleigh to Brighton and Cheltenham. To the east, the almost level country of the same pene-plain was noticed, looking as if sharply cut off by the Brushy Creek scarp and backed by the prominent Dandenong Ranges, whilst a few points to the north the rising ground of the Mitcham axis could be discerned, forming a parallel tract north of the railway line nearly to Croydon. The monadnocks (residual hillocks) of Pine-Mont, north-west of Ringwood, and Croydon Hill, beyond Ringwood to the east, are prominent features in the middle distance. These features were the more easily understood in the light of the recent work of one of our members, Mr. J. T. Jutson, described in papers read before the Royal Society. A short sketch of the volcanic history of this part of Victoria was included in the demonstration at this part of the proceedings. At this elevation of 420 feet the highest part of the pene-plain is reached, with the exception of Mitcham, at about 500 feet. The Reservoir Hill is covered with the Tertiary sand-cap of Kalimnan age, and represents a remnant of the once widely spread cover of the pene-plain extended to our view. In places the Tertiary sand has formed small, hard concretions, probably through partial solution of the sand grains by alkaline water and acids derived from decaying organisms at the surface, the cementing substances being both limonitic and siliceous. The arenaceous character of the soil on this hill is readily remarked from the abundance of English Broom, *Cytisus scoparius*, and the sand-loving tea-tree, *Leptospermum scoparium*. Turning down Elgar-road to the north, we passed into the reserve of the Surrey Dive. Originally a brick-pit, this splendid diving reserve has been filled with water, and is now apparently supplied from springs arising between the Tertiary sand-cap and the bed-rock (Silurian), the junction of which we noticed near the gate of the reserve. The springs are partly underground, and run through a series of "crab-holes," and the open runnels are marked by a growth of rushes. One face of the Dive shows a surface parallel to a leg of an anticline, whilst

another section at right angles shows the sharply-bent, V-shaped structure in the rock. Passing into White Horse-road towards Balwyn, a road-cutting showed, in a remarkably clear manner, the numerous cross-jointings of the bed-rock, which has been seamed with thin limonite veins, the veins themselves often projecting from the softer bed-rock, which has been readily worn away. It was here pointed out, as the party crossed the Templestowe anticlinal axis, lately described by Mr. Jutson, that this area can be traced by a line of "red gum-tree land" as far as the west of Doncaster. One of our members, Mr. A. O. Thiele, directed the leader's attention to this fact with regard to Templestowe, and the latter has been able to continue it southwards towards Mont Albert. The reason for this preference of the particular species of gum-tree, *Eucalyptus rostrata*, for this land is evidently afforded in its being a fracture zone seamed with quartz, giving the subsoil a rubbly texture, and thus suited for deep rooting. Surmounting the hill beyond Mont Albert, and turning to the north along the Union-road, a fine view of the Koonung Koonung Creek basin was seen and admired—one of the most striking areas in the landscapes around Melbourne. From this comparatively small basin-shaped hollow, somewhere about a million cubic yards of solid rock material must have been removed by this creek, which, by the way, flows into the Yarra at Bulleen, between Kew and Heidelberg. The junction of the bed-rock and Tertiary sand was here noted on the Union-road, by the moisture on the footpath, and the quartz reefs cutting through the latter showed up distinctly against the brightly-coloured ochreous and pink mudstone. The hill here close at hand is 380 feet, and, like its opposite point, the Reservoir Hill, is capped with Tertiary sand, although this fact is not noted on the old quarter-sheet geological map. This hill has no distinctive name, and it is here suggested that it should be called the "Balwyn Hill." The leader then took the party into his garden, where the junction of the Tertiary sand and the clay bed-rock is marked by a small spring, which runs after heavy showers. The excursion terminated by a walk to the top of Balwyn Hill, where, by aid of the increased refraction due to the setting sun and moistened atmosphere, the Divide stood out very sharp and clear, and even the chief volcanic points of eruption in the middle distance in the neighbourhood of Beveridge and Sunbury were plainly visible.—F. CHAPMAN.

IN accordance with the regulations, Mr. C. French, F.E.S., Government Entomologist, will be retired on 30th June next. This is greatly to be regretted, as Mr. French is mentally as well fitted as ever to continue his important duties.

IN THE DANDENONG RANGES SIXTY YEARS AGO.

By G. W. Robinson, C.E.

(Communicated by C. French, F.E.S.)

(*Read before the Field Naturalists' Club of Victoria, 10th April,* 1911.)

During the early years of this State—say, from 1854 to 1862, the period I was best acquainted with the Dandenong Ranges—palings and shingles were in great demand for building and roofing purposes, galvanized iron being at that time almost unknown. The Dandenong Ranges, being within comparatively easy distance of Melbourne, soon became one of the principal sources of supply. The paling-splitter invariably chose the tallest and straightest trees for his purposes; but to get at them in the recesses of the ranges meant cutting tracks through scrub often sixty feet in height.

When staying in 1854 at a farm-house about seven or eight miles from the locality since known as Emerald, I well remember a paling-splitter coming to the farm and giving an account of some immensely tall trees, which, he said, were over one hundred yards in length when felled, and describing the staging which it was necessary to erect before they could be cut down. I was greatly interested in his story, and wanted there and then to go and see them, but was informed that the place was so inaccessible and remote from any habitation that it would not be safe for me to make the attempt alone. However, three years later I had an opportunity of visiting the spot, and, from what I could see then, the paling-splitter had not exaggerated in the least. The difficulty was to get a good view of the full height of the remaining trees, owing to the density of the surrounding vegetation. If the butts could be seen the tops were invisible, and *vice versâ*; hence the impossibility of measuring their height accurately. It was seldom that a tree had a well-defined head; most of them seemed to suffer in the topmost branches from a sort of "die-back," such as may sometimes be noticed in fruit trees. On fallen trees this "die-back" often measured thirty feet or more, and affected stems up to nine inches in diameter, while in many trees the tops had been so long dead that, when felled, they crumbled into pieces, and so rendered accurate measurement impossible.

In the neighbourhood was a thick forest of young trees, about 60 feet high, growing so close together that, when waving to and fro in the wind, they looked like a gigantic crop of corn. I could see it would only be a matter of a few years before most of the best trees would be cut out, so I arranged with the splitters to let me know whenever they felled an extra big tree, so that I could go and measure it when cut down. It was

some time before I could make them understand that it was only the longest or tallest trees I wanted to measure; consequently, they would often send me word that a very large tree had been felled, but which, on comparison, with those growing around, was found to be shorter.

Referring back to my note-book for the measurements made by me at the time on the ground, I find that all those measured were over 300 feet in length. The longest that I met with was 342 feet to the commencement of the "die-back" portion of the tree, and as the stem there was from six to seven inches in diameter, I estimated the "die-back" portion to have been from 15 to 25 feet in length, thus giving an approximate length of 360 feet. Mentioning these facts one day to the late Baron von Mueller, he arranged that, if I could find a tree approaching 400 feet, he would come and inspect and measure it; but the opportunity never came.

About five years later a tree, which had just been felled, was pointed out to me by a splitter as being the longest he had met with. It was situated on the southern slope of a hill near a gully, about three-quarters of a mile north of the present Belgrave railway station. The tree measured 316 feet to the "die-back" portion of the stem. This amounted to 8 feet, and it is quite probable some 8 or 10 feet were missing owing to decay, which would give a total length of about 333 feet. This tree was one of a clump of about ten growing by themselves, as was the case with the other trees mentioned.

The last of the big trees in that district were cut down about 1862, and from an examination of them and their surroundings, I do not think they had experienced, at any period of their growth, any check from fires, such as has happened in later years. They were generally found at the foot of a steep hillside, sheltered from the sun and north wind. Their roots were constantly moist, owing to the mulch of decayed leaves, bark, &c., fully thirty inches thick, constantly decaying and as constantly being replenished. The rainfall was about 60 inches per annum, and at that time the splitters said that it rained more or less every day in the year. From an examination of the number of annular rings of the stumps, it would appear that these trees were quick-growing and comparatively short-lived, few of the stumps indicating more than 300 years.

White ants early attacked the roots and butts, while the "die-back" of the extreme tops added rotten wood at the other extremity. A gale of wind sweeping down on to the tall trees would snap them off by the roots, often bringing down two or three others in their fall. The buttresses of roots around each tree seemed out of all proportion to the tree. At about two or three feet from the ground they would often measure

from 60 to 80 feet in circumference, while 30 or 40 feet up the circumference would be reduced to about 20 feet. The trees had brown-coloured bark on the lower portions of the trunk, the upper portions being white, the bark being very thin. Baron von Mueller identified them as the mountain variety of *Eucalyptus amygdalina*, afterwards separated as a distinct species under the name of *E. regnans*.

Often, when scrambling about over logs and fallen branches to measure a fallen giant, the splitters seemed to regard me with pity, as being a little daft; and when I said a gentleman in Melbourne was anxious to get the measurements, it only increased their pity, and they regarded us both as daft.

As the paling-splitters invariably cut down the longest-barrelled trees first, in order to get the easiest-splitting timber, I have no doubt but that some of the earlier cut down trees would have measured quite 400 feet. It is reported that the late Mr. Heyne, secretary to Baron von Mueller, measured a tree as 365 feet to where the top was broken off. It is more than probable this was the tree I mentioned as measuring 342 feet.

It is greatly to be regretted that an endeavour was not made to preserve some of these extraordinarily tall trees from the timber-cutters. It was only after settlement had commenced, and roads were opened through the then State forest, that bush-fires appeared, and began to encroach on the ranges from all sides. The scrub would be burned a little further into the forest each year, so that the present appearance of the ranges is altogether different to what it was sixty years ago. No one who had not seen the district before these encroachments took place could conceive such an altered appearance, or ever believe that perhaps the tallest trees in the world grew there up to a comparatively recent date.

THE NEERIM FORESTS.—A contributor to the *Argus* of 28th March states that towards the head of the Latrobe River a splendid forest covering about 60,000 acres exists, the timber of which he values as being worth nearly nine and a half millions of pounds! The trees on several measured acres have been counted, and, while their height averages 300 feet, their contents, allowing the low estimate of 4,000 feet per tree, give the splendid yield of 160,000 feet of sawn timber per acre. One blackbutt yielded sixteen 6-feet lengths, from which 6,050 palings were split. These, at the rate of 18s. 6d. per 100, give a value of £04 10s. for the tree. From another tree the whole of the timber required for a cottage of five rooms was obtained.

THE STINGING OF *GRYLLOTALPA COARCTATA* BY *DIAMMA BICOLOR.*

By A. D. HARDY, F.L.S.

(*Read before the Field Naturalists' Club of Victoria, 10th April,* 1911.)

VENTURING out of my selected sphere of study, I ask for the indulgence of entomological members, on whose field I am trespassing, in order that I may offer some notes that seem to me to be of interest to students of the Hymenoptera and (though to a less extent) of the Orthoptera.

Of the great amount of literature dealing with bees, ants, and wasps, &c., we have on our own shelves the "Cambridge Natural History—Insects," parts i. and ii., by Sharpe, in which, in addition to the original matter, there are interesting quotations from Fabre, the French *savant*, with reference to the fossorial wasps; and to this and the work charmingly written by Dr. and Mrs. Peckham * I beg to refer you for both instruction and entertainment.

Foresters, graziers, market gardeners, orchardists, and horticulturists are for the most part unaware of their great indebtedness to the hymenopterous insects, and to the wasps (with which are included those known as "hornets") in particular. The mature and generally winged insects usually feed on nectar and fruit pulp: but for the larvæ, for the greater part of their existence, a carnivorous diet is required. For this supply there is a heavy tax on various insects, many of which are inimical to the welfare of mankind. Locusts, crickets, grylluses, grasshoppers, butterflies, moths, caterpillars, grubs, and beetles, and their larvæ, &c., are destroyed in great numbers

We do not overwhelm the wasp with our friendship, because of her well-known assertiveness and propensity to go more than half-way to meet a quarrel, while regarding our unintentional interference with her domestic arrangements as obvious provocation: but, if somewhat reserved in our affections, we may at least be unstinting of our respect. There appears to be less known of the "solitary," fossorial or "burrowing," wasps than of the "social" forms. The following is a quotation from Sharpe's reference to the Scoliidæ:—"The members of this family, as far as is known, display less perfect instincts than the Sphegidæ and Pompelidæ, but do not construct cells or form burrows. Information as to their habits is confined to European forms.† Again, under sub-family 3—Thynnides:—"Very little is really known as to their habits, though it has been stated that they

* "Wasps, Social and Solitary," G. W. and E. G. Peckham (1905).
† "Cambridge Nat. Hist.—Insects," part ii.

are parasitic on Lepidoptera, Bakewell having obtained specimens from subterranean cocoons." Subsequently, however, Froggatt published his Australian work, and, amongst other information as to formation of cocoons, &c., suggests that "the females lay their eggs in Lamellicorn larvæ living in loose soil."* Davis says :—"But, except as regards the kind of prey, there is a sufficient amount of adjustment to varying circumstances to warrant the conclusion that intelligence also plays a part in the complex series of operations."† The present is an example of the association of a "solitary" wasp, *Diamma bicolor*, Westwood,‡ the "black ant," sometimes called the "blue ant," and *Gryllotalpa coarctata*, Walker,§ the Australian Mole Cricket.

About a month ago, on a sandy grass-plot at Kew, Victoria, I noticed this apterous, ant-like, female wasp, conspicuous because of her dark purplish metallic sheen of body and brown legs and antennæ, dragging an apparently dead male "Mole Cricket." She did not use her legs except for locomotion, but grasped with her powerful jaws sometimes one, sometimes another, of the palpi, or at times an antenna of her prey; only occasionally a fore leg, which was always quickly abandoned for a head grip. The wasp struggled backwards with her captive, which she trailed along the ground or over the tangled grass shoots, experiencing much difficulty, especially on this occasion, as a recent cutting of the grass had left many loose pieces, that gave her an insecure foothold. Never once did she, by design or accident, attempt to bestride the cricket, for the very good reason that the latter was several times larger than herself, and besides, it is, I believe, the winged wasps which carry food in that manner, and countless generations of wasps of this species had probably worked in precisely this way. Now and again she left it to reconnoitre, always in one general direction, but with many little deviations, and on returning would renew hauling with greater vigour and seeming impatience, which was most evident when a blade of grass made further direct progress impossible. Then she would relinquish her tenacious hold of an appendage that one had expected to snap under the tensile strain long before, and would quickly bite away and clear the obstructions from the immediate vicinity until fairway had been obtained. Search in the direction indicated failed to reveal her objective, even

* Mr. F. Spry has informed me that at the National Museum, Melbourne, some of the life stages of *Diamma bicolor*, including the cocoon, may be seen.

† "Nat. Hist. Animals," Prof. Ainsworth Davis (1905).

‡ Identification confirmed by Mr. Chas. French, jun.

§ "Australian Insects," Froggatt (1907). [Mr Froggatt has since seen a specimen and confirmed the identification.—A. D. H.]

though the locality was approximately shown. When on one of these excursions, then about 12 inches away, she disappeared among the grass, I found her in a little bare patch busily removing, by means of her head and fore legs, some loose soil and small *débris*, until she exposed the entrance to a burrow, which had been cleverly concealed.

A few experiments were then made to test her sense of locality and instinct or intelligence. First, the cricket was quickly lifted and placed six inches away from the route. The wasp, on returning to the spot, was much agitated, and made a search that seemed to be quite lacking in method. Dr. and Mrs. Peckham (whose work I had not then read) have shown, notwithstanding Fabre's view—that the actions of wasps might almost be foretold under given circumstances, so certain are most of them to obey certain instincts—that many of the species are very variable in their habits The diagrams of locality study given by the Peckhams show a rough geometrical regularity in the case of careful study, but an erratic line of inspection when only a hasty survey was desired or possible. In the case under notice *Diamma bicolor* went over the same ground many times, leaving new ground quite unexplored. The first survey covered only a quadrant of a 9-inch radius circle of which the cricket was near the centre.

Lying on damp grass, and with much else to do that day, I found that my patience would not last long enough, in view of the wasp's want of originality, so I restored the cricket to its old position, where eventually she found him. During her search for the lost quarry she behaved in a peculiar manner, frequently stopping, curving the abdomen downwards, and rapidly stroking it with her hind legs. On recovering the cricket (which was showing signs of returning animation) she dragged it only a little way, and then, mounting upon it (head to tail), seized a portion of an abdominal segment in a powerful grip of the jaws, and, curving her abdomen downwards, moved the end about until a suitable spot was found at the junction of the thoracic segments, inserted her sting and held it there for about three seconds. The sting was not exposed at time of insertion, the extremity of the abdomen touching the cricket all the time; but, on withdrawal, the abdomen was raised and the sting drawn after it, until its length of about 2 mm. was visible. Gryllotalpa at once relapsed into his former limp condition, and the victor descended and resumed transport work.

Again I took advantage of a temporary absence of Diamma, and removed her victim, this time to a new locality, six inches or so away, and she re-explored the quadrant traversed in the previous search in the same unmethodical way as before. In

traversing the same ground many times during one survey both instinct and intelligence seemed lacking, unless it is to be admitted that the searching over ground already traversed was justified in view of the fact that after a similar unmethodical search of a quadrant only she had succeeded, and was now repeating the process: the two instances, therefore, being somewhat differently conditioned. The cricket was then restored to her.

Having allowed the pair to reach the burrow, which was of diameter large enough to permit the passage of the cricket's body, but larger than was necessary for the owner, and when they had almost disappeared (the wasp backing down first), I retrieved the cricket with my forceps and placed it nine inches away, near the old track. Diamma worked back to the scene of her last two searchings, frequently returning to the burrow, entering and re-appearing almost immediately. Next I stopped up the entrance to the burrow, and scattered a little loose soil about. When the owner returned she experienced some difficulty in locating the spot, but at last succeeding, quickly re-excavated, and, after a rapid examination of the surrounding space within a radius of a few inches, resumed the search. The cricket was now placed close to the burrow, where she soon found it, and, seizing first a palpus and next an antenna, renewed hauling operations. This time I interfered by holding with forceps a hind leg of the captive, and resisted the wasp's efforts, and then gently drew her prize away. Diamma redoubled her efforts for a few seconds, then, hastily climbing on to the body, took up a position as before, and, obtaining a good grip with her jaws, searched with the tip of her abdomen and stung as before in the same place. This time she seemed really angry, and inserted her sting in two other places, a little to one side, the first insertion of this series being like that which I first saw administered—in the median longitudinal line. The points appeared to be carefully selected, the insertions lasting about three and the intervals about two seconds. Gryllotalpa had been still and limp, but this violent attack set up a rapid trembling, of short duration, of the middle leg on the side remote from that recently stung, and the antennæ were still, which agrees partly with the Peckhams' account of a grasshopper stung by another species of wasp.

During her last search, and previous to this stinging, the wasp had behaved as before in frequently stopping to stroke towards its extremity her down-curved abdomen. Alternative suggestions are here offered to account for this—(1) During her activities the wasp had a secretion of poison continuing, perhaps to be in readiness for a new victim, and this was accelerated by anger, and caused irritation which she endeavoured

to allay by friction; or (2) the wasp, disappointed and angry at the loss of the prey, was deliberately stimulating poison secretion, with the intention of taking severe measures to prevent another escape, thinking that her victim had been understung. The question naturally presents itself, then, as to whether, deceived into excessive stinging, there would be any effect in the cricket worth noting. At this stage Diamma was transferred to a jar, where she died in convulsions, owing to an unavoidable inspiration of cyanide of potassium fumes.

The cricket may now have our undivided attention. He was placed in a small tin box of about three cubic inches capacity, with some damp earth—almost pure sand. In an hour he was moving his antennæ and palpi; a quarter of an hour later some of his legs were moving. At the end of two hours he had sufficiently recovered to shrink from a touch, and on the following morning seemed little the worse for his recent experiences. On being touched the cricket discharged from the posterior gland the malodorous defensive fluid which the species is known to secrete. Here I may note that on the day following the stinging I examined the insect with an inch objective and lieberkuhn, but could not find the slightest trace of punctures in the intersclerital membranes.

A week later the soil in the box—too shallow to give shelter—had become dry, but, on my adding water, the cricket at once commenced digging, and chirped a few times. On adding more sand he began burrowing, thrusting the loose soil on either side and upwards with powerful outward strokes of the flattened fore legs, and using his head also, but showed a tendency to progress spirally, so he invariably would reach a position in which he lay in the half-made burrow, and remained venter uppermost until set right again. Even when not burrowing he would fall on his back and become inert. This continued until a few days ago, when the peculiarity disappeared, and with it—excepting a weakness in the hind pair of legs—the last evidence of the stinging.* Functional activity appeared to be quite restored, as the defensive fluid was now secreted and ejected.

These few gleanings from the entomological harvest-field by a non-expert may suggest to some young members of the Club a sphere of observation where some useful work may be done. The grasshopper, locust, and mole cricket are all enemies of the sheep and cattle which depend on mankind for protection of their grazing rights. While noting the habits of the wasps, which destroy these and other pests, it would be interesting to record what enemies there are for these agile and formidable destroyers. Certainly, if any member had the least inclination

* After two months the cricket, without food, was alert and apparently in good health, then died suddenly.

to such a study, on perusal of Lubbock's (Avebury's) "Bees, Ants, and Wasps" and Peckhams' "Wasps, Social and Solitary," the desire would become irresistible.

A WARNING!—THE PASSING OF THE PASSENGER PIGEON.—The American publication, *Bird Lore*, in its record for 1910, says:—"The year may be fairly regarded as marking the passing of the Passenger Pigeon, *Ectopistina migratoria*. Not a single nest has been found nor a wild bird seen; and a solitary female, already eighteen years old, is said to be the sole survivor of the species in captivity. And this of a bird which many men still living can remember in flocks of millions, which darkened the day to dusk as they passed overhead! Only about thirty years ago, one of the places where they nested in Wisconsin was a strip of wooded country twenty-eight miles in length, in which there was not a single tree that had not several nests, while many trees were crammed with them. It was, of course, the greediness of man which has robbed the world of this unique type of long-tailed pigeon, with narrow, pointed tail-feathers like a parrakeet. Owing to their gregarious and confiding habits the birds were easily netted at their crowded nesting-places. In the 'Royal Natural History' published in 1895, this sentence occurs:—'There can be little doubt that the vast numbers of this pigeon have greatly diminished during recent years, and, though at present by no means on the verge of extinction, it seems certain that, unless laws are made for its protection, its extermination is only a matter of time.' Apparently it has been only a matter of sixteen years." The foregoing paragraph, taken from the *Country-side Monthly* (England) for April, 1911, shows how great is the risk we in Australia are running of having some of our birds and mammals recorded as extinct even during the lives of the present generation. It is to be hoped that the numerous sanctuaries which have been proclaimed in Victoria will be real sanctuaries, and not merely so by proclamation. The latest additions to our list comprise the area included in the shires of Ballan, Glenlyon, Mount Franklin, and Kyneton as a sanctuary for the Black-tailed Wallaby, where it is to be protected for the whole year, while for the rest of the State the period of protection will be from 1st May to 31st October; and an area in the vicinity of the Whittlesea railway station as a sanctuary for native game. It is hoped some supervision will be accorded to this latter area, especially on holidays. The Porcupine Ant-eater and the Satin Bower-bird have been added to the list of species protected for the whole year throughout Victoria.

CORRESPONDENCE.

EUPHORBIA JUICE AS A CAUSTIC.

To the Editor of the Victorian Naturalist.

Dear Sir,—With reference to Professor Ewart's note on Euphorbia juice as a caustic, in the *Victorian Naturalist* for May (page 20), experiments have been going forward with the juice of *Euphorbia peplus* in the Sydney district to my knowledge for at least five years. In 1908 I forwarded specimens to the Director of the British Cancer Commission in London at the request of a medical man, but I did not hear with what result. Indeed, I did not write the explanatory letter, which was written by the medical man referred to.

From the Botanic Gardens I have supplied the plant to at least one hundred applicants for treatment of rodent ulcer, chiefly in the face. Several of our medical men recommend it, and in most cases these people say that they come here at the request of their medical adviser. I have no doubt in some cases people come on their own responsibility, having heard of cures from their friends. As a rule, I do not hear of the patients again, since they are quite satisfied to recognize the plant to enable them to obtain supplies from rubbish heaps and other places in the Sydney district and elsewhere.

I have heard of a few instances in which the application of the juice has undoubtedly given relief, not merely from patients themselves, but from medical men.

As we have a number of Euphorbias under cultivation, some of which produce large quantities of milk, I suggested to at least two medical men that experiments with them might be tried, but have not heard whether my suggestion was carried out.—Yours faithfully, J. H. MAIDEN.

Botanic Gardens, Sydney, 15th May, 1911.

To the Editor of the Victorian Naturalist.

Sir,—Permit me to use your columns to ask the member of the Field Naturalists' Club from whom I recently received an anonymous letter to furnish me with his name and address, so that I may return the subscription he then enclosed.

D. BEST.

The Manuka in Flower in April.—Whilst walking near Box Hill on the 16th April I noticed a fine healthy plant of *Leptospermum scoparium* in splendid flower. Should this be considered late or early flowering? In either case, is it not rather an uncommon occurrence? It is almost needless to say no insect life was on the flowers.—D. Best.

"Nests and Eggs of Birds Found Breeding in Australia and Tasmania."—The first part of the third volume of this special catalogue, published by the Australian Museum, Sydney, has been issued. In it the author, Mr. A. J. North, C.M.Z.S., Ornithologist to the Museum, deals with the nests and eggs of the remaining species of the order Picariæ, comprising the Cuculidæ (cuckoos), of which many interesting notes are given. A commencement is made with that typical Australian order, the Psittaci, of which the Loridæ (lorikeets) and some of the Cacatuidæ (cockatoos) are dealt with. The illustrations are, as usual, excellent, and the plate of an aboriginal taking the nest of a Blue-bellied Lorikeet strikingly illustrates the difficulties met with by the student of oology.

Colour Effects.—"A favourite food of the great green gold, and black butterfly, *Ornithoptera cassandra*, is the nectar of the hard, dull-red flowers of the Umbrella-tree, and this fact assisted in an observation which seems to prove that plants play tricks on insects. Amongst the introduced plants of Dunk Island is one of the Acalyphas. Butterflies which have feasted among the Umbrella-trees on the beach and on the edge of the jungle flit about the garden, and almost invariably visit the red but nectarless Acalypha. One began at the end of the row, examined the topmost leaves, flitted to the next, and so on, lured by the colour and disappointed by the absence of nectar, twenty-five times in succession, until it blundered on the red Hibiscus bushes and began to feed.—From "Confessions of a Beachcomber"—a delightful record of a nature-lover's life in tropical Queensland.

The National Parks and Forest Reserves of Australia.—Two addresses by Mr. W. H. Selway, as chairman of the Field Naturalists' section of the Royal Society of South Australia, given at the two last annual meetings, have been issued in pamphlet form, and present in clear and concise terms what has been done in Australasia up to the present time in setting aside land for national parks — that is, reserves where the native fauna and flora may flourish unmolested—and as reserves for forest purposes. For the former purpose he credits New South Wales as having 69,000 acres; Victoria, 169,000; Queensland, 26,500; South Australia, 95,000; Western Australia, 210,000; and Tasmania, 16,000. On the question of forestry he is very emphatic as to the indifference the Australian States are displaying with regard to future demands for timber, and urges immediate attention to the question. He gives the area of land in the Commonwealth specially reserved for timber as 1.36 per cent., and the total forest area as 5.29 per cent.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The thirty-first annual meeting was held at the Royal Society's Hall on Monday evening, 12th June, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 45 members and visitors were present.

REPORTS.

In the absence of the leader, Dr. Pritchard, F.G.S., a brief report of the excursion to Altona Bay on Saturday, 13th May, was given by Mr. F. G. A. Barnard, who said that, favoured by a beautiful autumn afternoon, a party of about fifteen members, with a number of students from the Working Men's College, had walked from North Williamstown to the recent shell-beds near the racecourse, so fully described in the *Naturalist* for June, 1909, then to the sea-shore, and finally on to the brown coal mine at Altona—a distance of over four miles. At each place the leader had fully explained the features of the locality. Though so late in the season, a few wild flowers were noted, such as *Pimelea serpillifolia* and *Brachycome calocarpa*. On a pond near Williamstown both Azolla and Lemna were growing abundantly. When returning, about a dozen Black Swans were seen on a large swamp near Altona.

A report of the visit to the National Museum on Saturday, 10th June, was, in the absence of the leader, Mr. J. A. Kershaw, F.E.S., given by Mr. F. G. A. Barnard, who said that a party of about twenty members spent a wet afternoon very pleasantly in studying under Mr. Kershaw's guidance the collection of Australian birds in the museum. Portion of the reference collection was also inspected and explained.

A report of the junior excursion to East Coburg on Saturday, 3rd June, was given by Mr. Chas. Stout, the hon. secretary to the juniors, who said that, as the leader, Mr. C. Waters, had been unable to attend, Mr. A. James, a non-member of the Club, had kindly acted as leader. The party was small, doubtless owing to the unpropitious weather, but an interesting and instructive afternoon had been spent in examining the basaltic formation on the west side of the Merri Creek, and contrasting it with the sandstones and shales of the eastern side. Some attention was also given to the evidences of river action and canyon formation, which are so well shown on a miniature scale in the locality.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. C. C. Brittlebank, Government Vegetable Pathologist's office, Melbourne; Mr. W. G. M'Intosh,

191 Brighton-road, St. Kilda; and Mr. R. Mitchell, 151 Manning-street, North Melbourne, were duly elected as ordinary members, and Master Noel W. M'Haffie, Church of England Grammar School, South Yarra, as a junior member of the Club.

GENERAL BUSINESS.

The president referred to the retirement of Mr. Chas. French, F.E.S., from the position of Government Entomologist. This, for many reasons, was to be regretted. Mr. French was one of the founders of the Club, and had always taken a great interest in its progress, that would not cease with his cessation of public duties, and his official work was well known and appreciated. It was gratifying to note that his son, Mr. C. French, jun., also an energetic and valued member of the society, was now Acting Government Entomologist. Mr. French, jun., had done good work, and his appointment would give room for expansion of his work. He trusted that the position would improve with it.

The hon. treasurer asked the chairman whether it was necessary for a junior to be re-nominated as an associate, or an associate as an ordinary member, on reaching the qualifying age for the advanced membership. Hitherto he had accepted the increased subscription and transferred the individual to the other list. The president said the rules were indefinite on the point, but he considered that re-nomination and election was the correct way. It was decided to adopt this course in future.

ANNUAL REPORT.

The hon. secretary, Mr. A. D. Hardy, F.L.S., read the thirty-first annual report for the year 1910–11, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen,—Your committee have the honour to present for consideration the thirty-first annual report of the Club, being for the year ended 30th April, 1911.

"The year has, in several respects, been an uneventful one; but good progress has been made in many directions, and, on the whole, we may review the past twelve months with satisfaction, even in the face of a reduced credit balance. Accession to membership was slightly less than during the preceding year. In all, 64 new members were elected, comprising 16 ordinary, 8 country, 7 associate, and 26 junior members. The total membership now amounts to 282, being made up as follows:—7 honorary, 2 life, 142 ordinary, 60 country, 20 associate, and 51 junior members. When compared with the year 1909–10, this about equals the difference in numbers of juniors, due, perhaps, to the stronger attraction of the military movement and the corresponding

accession to the ranks of the boy and girl scouts. We regret the death of Mr. F. R. Godfrey, who had been a member since 1883; of Mr. F. M. Reader, who, though not a member in recent years, contributed papers of botanical importance to our journal; and of Colonel J. R. Y. Goldstein, who was one of the founders of the Club, and at one time vice-president, though of recent years he had followed other inclinations. The recent death of Mr. O. A. Sayce, A.L.S., an original member and past president of the Club, is a calamity that will mark the past year as a memorable one, and a tribute to his work appeared in the June *Naturalist*.

"The attendance at general monthly meetings fluctuated between 50 and 100, including visitors, according to the weather or the nature of the subjects of the papers. At the August meeting, Dr. Danés, of the Geological Department of the Bohemian University of Prague, was welcomed.

"The papers read during the year numbered 21, and were of a varied nature, as follows:—Botany, 8; geology (including mineralogy, physiography, palæontology), 4; zoology (including ornithology, entomology, entomostraca, and protozoa), 7; and general, 3. At the August meeting the Club was favoured with an illustrated lecture by Mr. R. T. Baker, F.L.S., Curator of the Technological Museum, Sydney, entitled "Our National Heritage: the Gum-trees," which was greatly appreciated by a large audience; and at the September meeting Mr. J. A. Leach, M.Sc., delivered a lecture on "Birds of Victoria," which was, under adverse circumstances, highly successful. Authors of papers read were Messrs. R. W. Armitage, B.Sc. (2), J. W. Audas (2), F. G. A. Barnard, A. G. Campbell, F. Chapman, A.L.S., A. J. Ewart, Ph.D., D.Sc., F.L.S. (2), J. C. Goudie, A. D. Hardy, F.L.S. (3), J. A. Kershaw, F.E.S., A. W. Lee, D. M'Alpine, J. G. O'Donoghue and P. R. H. St. John, J. Searle, and G. A Waterhouse, B.Sc., F.E.S.

"Application from abroad for certain numbers of the *Victorian Naturalist*, and reviews by other journals, are a tribute to the importance of the papers contained in many of the numbers, while an increased exchange list, on the invitation of other bodies, speaks well for the journal as a whole. For this the Club is indebted to the members who have contributed original papers and to those whose descriptive notes of travel, exhibits, &c., keep up the interest shown in the Club's literary production, and also to the hon. editor, Mr. F. G. A. Barnard, to whose careful supervision much of the success of our journal is due.

"Natural history notes and exhibits have been important features of our monthly meetings, and the discussions following the reading of papers have at times been very informative. It

is hoped that members will, in response to the committee's invitation, supply the natural history notes in writing, and consult the secretary before reading, as many of the notes, if expanded, would have increased value, and be more acceptable as papers. The natural history note, as such, should not be a vehicle for the publication of original matter, if liable to contention or controversy. In response to the suggestion in the last annual report, in addition to novelties, many interesting though previously recorded species and objects were re-exhibited, and did not fail to gain attention, especially of the newer members, who thus had an opportunity of viewing them for the first time.

"The thanks of the Club are due to the leaders of senior and junior excursions, which, on the whole, were of a successful character, and to Mr. Chas. Stout, an associate member, who acted as hon. secretary to the juniors. It is regretted that the projected Easter visit to Anglesea was not realized, and that intending excursionists were disappointed, especially as the Christmas excursion had been purposely omitted from the programme. The committee has prepared a provisional list of excursions for the coming year, so as to be ready for the consideration of their successors on taking office.

"The annual exhibition of wild flowers was not so successful as in previous years, owing to the unfavourable weather conditions, which, to a great extent, prevented collecting, and lessened the attendance at the hall. Nevertheless, an interesting show was arranged, and the committee are satisfied that the plan of holding the exhibition on the evening of the general meeting and on the afternoon and evening of the following day is one that should be repeated.

"The 27th volume of the *Victorian Naturalist* has been completed and issued, with index, list of exchanges, and revised list of members. It is characterized by increase in the number and excellence of the illustrations. Messrs. Patterson, Shugg and Co. and Messrs. Walker, May and Co. have been responsible for the processes of reproduction, and little, if any, of the merit of the original photographs and drawings has been lost.

"The Club has been actively engaged, as a whole or by the committee, in initiating or supporting movements for the preservation of the native fauna and flora and of scenery in Victoria, and for the protection of gay-plumaged birds generally. Much progress has been made, and it is pleasing to record that, in addition to State areas protected in Victoria, fourteen additional private properties have been proclaimed 'sanctuaries' at the request of the owners, making a total, in this class, of about thirty-five. As to Crown lands, the results are not disappointing, and, while looking for an augmented list during

the ensuing year, we appreciate the good work already done by the Fisheries and Game branch of the Department of Agriculture under Major Semmens, the Chief Inspector, and the thanks of the Club might well be recorded for the sympathetic attitude of the Minister, Mr. Geo. Graham. The following additional State sanctuaries have been proclaimed :—Gemmel's Swamp (Mooroopna) ; Echuca North and Wharparilla ; Kow Swamp and First, Second, and Third Lakes (Kerang district) ; and an extension of protection over Wilson's Promontory, by which the Agricultural Department reserves from sportsmen, &c., all native game on portions of the Promontory omitted from the National Park, some adjacent islands, and an encircling strip of water, which gives security to the shore-life. On a suggestion from your committee, the National Park reservation has been extended northerly to cover the feeding-ground of swans, pelicans, &c., in the southern part of Corner Basin. In course of proclamation are two other areas—viz., Lake Linlithgow, and the southern end of Dandenong State Forest, of which the east branch of Monbulk Creek forms the south boundary (together with the creek frontage on the south).

"The Club's protest against the alteration of the close season for quail was unsuccessful, as was a similar protest by the Advisory Committee on the *Game Act.*

"The Plant Records Committee has been quietly at work on its difficult task, and the first instalment of the list of provisional common names adopted for native plants is expected to be published in the June number of the *Journal of the Department of Agriculture.*

"Your committee regrets that negotiations by representatives of the Royal Society of Victoria, the Historical Society, the National Parks Association, and the Field Naturalists' Club for the purchase of the site of the aboriginal implements quarry at Mount William, near Lancefield, have so far failed, as it seemed that no reasonable terms could be arranged with the owner of the land as a basis for further action.

"Some alarm was caused a few weeks ago by a press report of an avowed intention on the part of the Department of Agriculture to reduce the position of Government Botanist, which includes Curatorship of the National Herbarium. As the action contemplated would materially affect the botanical interests of this Club, no time was lost in forwarding a resolution pointing out the seriousness of such a movement.

"The committee desires to thank Messrs. Morton and Coghill for office accommodation during the early part of the year, since when the offices of Messrs. Coghill and Haughton, 79 Swanston-street, have been kindly placed at our disposal on committee nights.

"The hon. librarian reports that during the year 12 volumes were purchased and 57 parts acquired by subscription, while 184 parts were received in exchange. Donations, numbering 49 volumes or parts, have also been received from Prof. Ewart, D.Sc., Messrs. F. M. Bailey, F.L.S., E. J. Dunn, F.G.S., J. H. Maiden, F.L.S., D. M'Alpine, and others. Several books ordered by the committee have not yet come to hand. Some 35 volumes were bound, and about 20 sets of parts are now ready for binding. Printed copies of the library rules have been issued to borrowers as book-marks. Good use had been made of the library during the year, and, though comparatively few members availed themselves of its advantages, the number of books borrowed had been fully one-third more than in the previous year.

"The financial statement to be submitted herewith at first glance does not seem quite so satisfactory as has been the case for some years past. The receipts for the year amounted to £153 17s. 3d., and the expenditure to £209 8s. 9d., thus reducing the credit balance from £146 16s. 2d. to £91 4s. 8d. The decrease in receipts is accounted for by the fact that arrears of subscriptions paid have been considerably less than in the previous year, and fewer sales were effected of back numbers of the *Naturalist*. The increased expenditure was mainly due to the increasd cost of the *Naturalist*, amounting to nearly £30, owing to the greater number of pages and illustrations, other items of expenditure being about the same.

"We regret the departure from the State of Sir T. Gibson-Carmichael, whose deep interest in natural history was not occulted by the many calls on his time as Governor of Victoria, and whose appreciation of the Club's objects and work has been expressed on many occasions.

"Finally, it may be regarded as a matter for self-congratulation that the Club pursues its way steadily, notwithstanding the going and coming of individual members, and the vicissitudes—political, commercial, &c.—of the times; and that, while receiving valuable encouragement and help and advice from such institutions as the National Herbarium, National Museum, Entomological Museum, &c., of which the respective curators are members of our society, we are, in turn, able and have in the past not failed to benefit several State departments by affording information which the Club is peculiarly fitted to collect and present—an interchange of courtesies which your committee thinks is one that should be preserved at all costs.

"On behalf of the committee,

"Frank Wisewould, *President.*

"A. D. Hardy, *Hon. Secretary.*

"Melbourne, *30th May*, 1911."

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, read the financial statement for 1910–11, which was as follows :—

RECEIPTS.

To Balance, 30th April, 1910						£146	16 2
,, Subscriptions—							
Ordinary Members ...	£100	17	6				
Country Members ...	19	0	6				
Associates	8	1	3				
Juniors	2	9	0				
				£130	8 3*		
,, *Victorian Naturalist*—							
Subscriptions and Sales	7	12	0				
Advertisements ...	6	15	0				
Reprints	4	12	6				
				18	19 6		
,, Sales of Badges				0	6 10		
,, Interest, Savings Bank Account				4	2 8		
						153	17 3
						£300	13 5

*Subscriptions :—Arrears, £15 1s. 3d. ; 1910–11, £113 2s. ; 1911–12, £2 5s.—total £130 8s. 3d.

EXPENDITURE.

By *Victorian Naturalist*—							
Printing	£92	14	5				
Illustrating	25	15	5				
Free Reprints	7	19	1				
Reprints	5	14	11				
				£132	3 10		
,, *Victorian Naturalist*—							
Wrapping and Posting				16	8 0		
,, Rooms—Rent and Attendance				13	15 6		
,, Library—Books ...	5	12	6				
Periodicals ...	5	16	0				
Binding ...	8	11	0				
Insurance, &c. ...	0	14	6				
				20	14 0		
,, Expenses—Wild Flower Exhibition ...				1	16 6		
,, Wreath—Late O. A. Sayce				1	1 0		
,, Printing and Stationery				15	2 0		
,, Postages and Sundries				8	7 11		
						209	8 9
,, Balance—Cash in hand ...	0	2	0				
Savings Bank	124	2	8				
				124	4 8		
Less Amount due London Bank				33	0 0		
						91	4 8
						£300	13 5

G. COGHILL, *Hon. Treasurer.*
18*th May*, 1911.

Audited and found correct.

D. BEST,
J. STICKLAND, } *Auditors.*

30*th May*, 1911.

The following statement of assets and liabilities was also read :—

ASSETS.

Balance	... £124 4 8		
Less due London Bank	... 33 0 0		
		£91 4 8	
Arrears of Subscriptions (£47), say ...	...	37 2 5	
Library and Furniture (Insurance Value) ...	...	150 0 0	
		£278 7 1	

LIABILITIES.

Subscriptions to Club and *Naturalist*, paid in advance ...	£3 0 6

The report was received, on the motion of Dr. Hall, M.A., seconded by Mr. A. H. E. Mattingley, C.M.Z.S., and in the discussion which followed, Mr. D. Best, one of the auditors, said that there was one point only to which he thought it his duty to draw attention, and that was the loss on the year's transactions of about £50. Without feeling alarmed, he desired to caution the incoming committee to exercise economy in order to keep the credit balance uppermost, and suggested that less money be spent on the library. Mr. Mattingley remarked that the Club had over £100 to its credit in the Savings Bank, which, he thought, should be fixed as a permanent deposit bearing interest. Dr. Hall disagreed with the last speakers, if their idea of economy meant impoverishing the Club's literature. No better way of using the money within reason could be found than to procure the necessary reading matter and to bind it. Much useful literature remained unread in many libraries for want of convenience in handling in its unbound condition.

Mr. Barnard said that, as editor, he felt himself somewhat responsible for some of the increased expenditure, as the journal this year had cost more to produce, owing to the increased number of pages and illustrations ; but, on the other hand, it was an improved journal, and was worth the expense.

Mr. Coghill claimed that his policy as treasurer was to be as liberal with money required for the improvement of the Club as he could consistently with the desire to improve the credit balance. The increased expenditure would be justified by a better library attracting members. He had not, owing to pressure of private business, been so energetic in getting in arrears of subscriptions, but this would be remedied during the ensuing year.

The hon. secretary said that if the treasurer had been less energetic in the preceding years the drop in the amount of subscriptions received during the past twelve months would have been less noticeable, if at all. The present case only drew

attention to the past and probable future activities of the treasurer.

On the motion of the chairman, seconded by Mr. Mattingley, the report was adopted.

ELECTION OF OFFICE-BEARERS FOR 1911–12.

The following office-bearers, being the only nominations received, were declared duly elected :—President, Mr. F. Wisewould ; vice-presidents, Mr. J. A. Leach, M.Sc., and Mr. J. A. Kershaw, F.E.S. ; hon. treasurer, Mr. G. Coghill ; hon. librarian, Mr. J. T. Hamilton, F.L.S. ; hon. editor, Mr. F. G. A. Barnard ; hon. secretary, Mr. A. D. Hardy, F.L.S. No nomination was received for the position of hon. assistant secretary and librarian. On a ballot being taken for five members of committee, Messrs. R. W. Armitage, B.Sc., J. Gabriel, G. A. Keartland, F. Pitcher, and Dr. C. S. Sutton were duly elected.

PAPER READ.

1. By Mr. H. B. Williamson, entitled "A Cycle Trip through Eastern Gippsland."

In the absence of the author, the paper was read by Dr. Sutton. The author described the principal botanical features of the Orbost district, referring especially to the palm grove at Cabbage-tree Creek, which, so far as Victoria is concerned, is unique. He exhibited photographs of some of the palms, which, he said, numbered about forty, and remarked on the absence of young plants to replace those which might be destroyed either intentionally or by accident.

In the discussion which followed, the question of better protection for the palms, *Livistona australis*, at Cabbage-tree Creek was raised, Mr. St. John having, during a recent walking tour, seen that some persons had cut out the tender, growing heart of the crown of leaves, presumably for food.

Dr. Hall questioned the advisability of too hurriedly claiming isolation for the group of palms referred to, there being portions of Gippsland not yet fully explored, and other groups or individuals might be discovered. Protection, however, was very necessary, and the amount at present afforded should be inquired into.

Messrs. Barnard, Hardy, Gates, and Pitcher also spoke.

NATURAL HISTORY NOTE.

Yellow-footed Pouched Mouse.—Mr. A. H. E. Mattingley, C.M.Z.S., said that he had recently taken specimens of the Yellow-footed Pouched Mouse, *Phascogale flavipes*, Waterhouse, in the Bacchus Marsh district, near Parwan. These little animals may be easily mistaken for rats, as they measure about 8½ inches in length, and are therefore very large for mice. They

frequent the hollows of logs and tree-trunks, or in open country the crevices of rocks. Stone walls are favourite hiding-places, no doubt on account of the secure shelter they afford. They are easily distinguished from the ordinary house-rat when running about on account of their rufous-grey colour, sometimes of a yellowish tint. The limbs and feet especially being of a dull yellowish shade, there is no difficulty in identifying the animal. It has a wide distribution, and is exceedingly active, running very quickly for short distances, and it is remarkable how easily they can hide in a small crack or fissure in a tree, which apparently seemed too small to accommodate them.

EXHIBITS.

By Mr. F. G. A. Barnard.—Zeolites, &c., from Clifton Hill Quarry excursion.

By Mr. C. J. Gabriel.—Marine shells found on south-west corner of Coode Island, viz. :—*Cytherea kingii*, Gray, *Chione nitida*, Q. and G., *C. strigosa*, Lam., *Spisula parva*, Petit, *Arca trapezia*, Desh., *Nassa labecula*, A. Ad., and *Natica conica*, Lam. ; also the following shells from an excavation on the island :—*Tellina deltoidalis*, Lam., *Pecten medius*, Lam., *Mytilus planulatus*, Lam., *Solen vaginoides*, Lam.; *Trophon paivæ*, Crosse, and *Diloma odontis*, Wood.

By Mr. F. Pitcher.—Remarkable growth of Bathurst Burr, *Xanthosium spinosum*, L., from basalt near Melbourne ; also fresh specimens of the introduced weed *Euphorbia peplus*, L., the Petty Spurge, a native of Europe, Western Asia, and Africa, referred to in the current *Naturalist*.

By Mr. P. R. H. St. John.—Specimens of " Blue Peppermint Gum," *Eucalyptus dives*, Schauer, collected about three miles west of Mount Blackwood, 29th May, 1911.

By Mr. J. R. Tovey.—Specimens of Globe Chamomile, *Matricaria globifera*, Fenzl., *Mesembryanthemum angulatum*, Thunb., and *Tetragona decumbens*, Mill., all natives of South Africa, collected at Coode Island ; also of *Solanum elæagnifolium*, Cav., from tropical America, collected in railway reserve, North Melbourne.

By Mr. H. B. Williamson.—Photographs of palms at Cabbage-tree Creek in illustration of paper.

After the usual conversazione the meeting terminated.

The many friends of the late Mr. O. A. Sayce will regret to learn that his widow passed away on the 24th June, just eight weeks after her husband's death. Her death was to a great extent due to the shock occasioned by the loss of her husband.

EXCURSION TO SYDENHAM, BULLA, AND DIGGERS REST.

Fourteen members of the Club and half-a-dozen geological students from the Continuation School caught the 6.42 a.m. train for Sydenham on Monday, the 24th April (Eight Hours Day), to take part in a geological trip in the neighbourhood of Bulla. The party was increased in number at Bulla by three other members, one of whom had missed the early train and had walked out from Essendon, while the other two had motored out from Brighton. The features examined during the day are to be found on Quarter Sheet No. 7, S.E., of the Geological Survey of Victoria, and some notes as to the geography of the district will be found in the report of an excursion made by the Club some years ago (*Vict. Nat.*, vol. xvii., p. 120).

From Sydenham railway station we walked across to the Saltwater River, taking a course north-westerly along the railway line at first for about a mile, and then almost north across the paddocks for another mile and a half. We first noticed the deeply-sunk valley of the Saltwater River, about 230 feet below the level of the basalt plain. On the outpouring of the basalt sheets the pre-basaltic drainage system was obliterated. The new rivers wandered about on the fairly level basalt plains as they made their way to the sea. This meanderine course, once attained, was to a great extent persisted in, the rivers gradually trenching their channels deeper and deeper, until now they flow in a sinuous course at the bottom of very young valleys, which they are still actively corrading as well as laterally eroding. The basalt of the plains near here is very vesicular, one vesicle we measured being over 15 inches in length. About 400 yards west of the famous "Organ Pipes," which have been so admirably described by Dr. T. S. Hall in the excursion report previously mentioned, were to be seen the tops of partly denuded basaltic columns, showing, by the angles they made with the horizontal, that just at this locality a pre-basaltic river channel must once have existed. The sides of this ancient river-channel were mantled with argillaceous sand overlying shales, probably Ordovician in age, having a general northerly strike and a high angle of dip. After viewing the "Organ Pipes," a mass of basalt columns forming a river-cliff on a concave bend of the Saltwater River, we climbed out of the valley and passed over the basalt plain to the north-east for a distance of slightly less than two miles. Here we met with the entrenched meander on Deep Creek figured in Professor Gregory's "Geography of Victoria," on p. 152. This feature is about a mile and a half south of Bulla. Usually, entrenched meanders are due to the revivification of a stream causing a new young channel to be cut down in the

old flood-plains laid down at an earlier stage in its history when it was a more mature stream. But in this case it seems that the river has cut down through a thin capping of basalt on to the Tertiary sands and clays. Through these the stream has corraded its channel into the underlying Palæozoic strata, and not into a previously deposited alluvium. The variation in slope of the valley sides at different heights is noticeable. The highest parts of the valley walls are very precipitous where they consist of basalt, but the lower parts have a gentle slope where they consist of the softer Tertiary sediments. At the north of this meander a tributary valley running along the junction between granitic rock and metamorphosed Palæozoic strata mouthed at a height of about 80 feet above the level of Deep Creek, giving a good example of a hanging valley. The cause of the presence of this valley, as at Werribee Gorge, where a fine example in a syncline is to be seen, is that the tributary rarely has very much water flowing down it, and so cannot corrade its valley at anything like the rate the main stream does. The main stream continues to flow at lower and still lower levels, leaving the tributary to debouch over a ledge as a waterfall at a more and more badly adjusted level. This goes on until the main stream becomes mature, and almost ceases further corrading its valley. The tributary continues gradually corrading its valley until it enters at main stream level, the river system then becoming mature. A hanging valley is always an indication of immature physiographic conditions and of bad adjustment of the various parts of the drainage system. This hanging valley practically marked the boundary between basalt on the upper part, with Palæozoic strata on the lower part of the west side, and granite on the east. The Palæozoic strata consisted mainly of hornfels—a rock the product of intense metamorphism caused by the intrusion of the granite—a plutonic igneous rock. Into these strata had been intruded many small acid igneous tongues and veins from the main plutonic mass. In one case a compact fine-grained granitic apophysis, about 20 feet wide, was examined. This had been squeezed in between the strata along the bedding planes. In the creek-section the amount of dip of the strata is 65°, with a direction E. 20° S., the strike being N. 20° E. The strike of the strata continued, with no deflection whatever, right up to the granite. This seems to point to the conclusion that the plutonic rock, as it came up, quietly ingested and altered the sediments that overlay it, instead of pushing them up into an arch or dome. Daly calls this "magmatic stoping." These highly metamorphosed strata consist mainly of hornfels, a very fine-grained rock consisting of cordierite, secondary brown mica, secondary white mica (sericite), secondary quartz,

tourmaline, and andalusite. On passing west down Deep Creek the hornfels beds gave place to beds of a very tough conglomerate, very much like the Kerrie conglomerate near Riddell. The pebbles were dented in such a way as to show the immense pressures to which these conglomerates had been subjected in consequence of protracted earth movements. From lithological comparisons with similar conglomerates, these are probably of Upper Ordovician age, although they may be basal Silurian. On leaving this spot a traverse was made north for a mile and a half over the granite, whose highest portion stood about 110 feet above the basalt plain around. This granite outcrop must once have been at a much higher level, as evidenced by the huge tors or monoliths left outstanding on the topmost portions. On arrival at the Bulla school-house, Master Moore, son of a local resident, had provided milk and hot water for the party. These were very acceptable, and enabled us to enjoy a cup of tea with the lunches we had brought. After lunch we inspected sections of great masses of kaolinized granite near Bulla. This shows itself to be a much decomposed granite, in which the biotite has completely chloritized, or even become quite bleached, while the quartz remains loosely embedded in a mass of kaolin from the complete hydration and carbonation of the felspars. This kaolinization may be due to the gradual attack of surface waters bearing carbon dioxide, in which case an analysis of the material should reveal the presence of carbonates. On the other hand, the decomposition of the granite in this area may be due to the operation of vapours containing fluorine, boron, and, perhaps, to a less degree, chlorine, which attack the granite during the latest stages of its intrusion. This process of alteration by hot vapours is known as pneumatolysis, the results being well shown in the carclazyte or kaolin deposits of Cornwall. A recent paper by Mr. J. H. Collins (Q.J.G.S., vol. lxv., No. 258, p. 155) records an interesting example of pneumatolytic action on a granite. With regard to the Bulla area, the kaolinized granite is distinctly local, and seems to have some connection with the fact that it occurs in that portion of the granite which is, or has been, covered by the basalt flows, while the higher portions of the granitic mass, which have presumably never been covered by the basalt, have escaped kaolinization. The process may have begun by carbonated water soaking in along that portion of the granite just overlapped by the basalt, and may have extended downwards, and in under the basalt, from the junction. The apparent absence of fluorite and tourmaline from the kaolinized granite does not favour the pneumatolytic theory, as one would expect to get these minerals formed where hot fluorine, boron, and

chlorine vapours had been acting on the granite. This matter, of course, requires working out carefully before a definite cause for the kaolinization can be assigned. From Bulla we walked almost west for about four miles to the graptolite beds on a natural section formed by a river-cliff on the Saltwater River, about a mile and three-quarters north of Diggers Rest. Here we were successful in procuring great numbers of easily-identifiable graptolites, which showed the rocks to be Upper Ordovician in age. Amongst others, good specimens of the following were obtained :—*Dicranograptus ramosus*, *Dicellograptus elegans*, *Nemagraptus gracilis*, *Diplograptus*, sp., *Climacograptus bicornis*, *Lasiograptus*, sp., *Cryptograptus*, sp., and *Glossograptus*, sp. The beds in which these were obtained consist of dark blue slates striking a little E. of N. and dipping westerly at high angles, varying from 65° to 80°. After spending about an hour at these fossil beds we arrived at the Diggers Rest station in ample time to return in the train that left at 6.37 p.m. for town.

Dr. C. S. Sutton has kindly handed me the following notes on the botany of the outing :—" The members more particularly interested in plant life had good reason to be pleased with their botanical findings during the excursion. The late season had been so favourable that, out of over 100 species noted, quite 40 (most of which, in other years, would not have been so conspicuous) were now in flower : and although by one of us with an experience of 20 years in the locality nothing new was discovered, the occurrrence of some species was a pleasant surprise to the others. The plants met with roughly fell into two categories—those on the exposed basalt plains and those in the river gorges. On the basalt the vegetation, which it is safe to say has presented much the same appearance ever since its first establishment, is a grass formation containing also a fair variety of other plants not exceeding it in height, and with a marked absence of tree growth. Similar vegetation, with little variation, also covers the greater part of the other basalt plains extending nearly to the western border of the State. The principal grasses were the ' Wallaby Grass,' *Danthonia penicillata*, and the ' Kangaroo Grass,' *Anthistiria ciliata*, with sparsely-scattered saltbushes, such as the ' Hairy Blue-bush,' *Kochia villosa*, the ' Berry Saltbush,' *Atriplex semibaccata*, the ' Barrier Saltbush,' *Enchylæna tomentosa*, and the ' Nodding Saltbush,' *Rhagodia nutans*. Of the other small plants, the ' Yellow Wood-Sorrel,' *Oxalis corniculata*, whose capsules were continuously in evidence, the ' Maiden's Blush,' *Convolvulus erubescens*, the ' Common Rib-weed,' *Plantago varia*, the ' Common Woodruff,' *Asperula oligantha* ; and, among a goodly number of Composites, *Vittadinia australis*

Brachycome calocarpa, the 'Desert Daisy' (both in flower), and *Lagenophora emphysopus*, the 'Short-scaped Bottle Daisy,' were those most frequently recurring. Of the less common species, *Rutidosis leptorhynchoides*, *Helichrysum rutidolepis*, *Brachycome radicans*, the 'Rooting Marsh-daisy,' *Ptilotus macrocephalus*, the 'Foxtail,' and *Pimelea serpillifolia*, the 'Coast Rice-flower,' were also flowering. The common rock-fern, *Cheilanthes tenuifolia*, was the only one met with here, in the driest places, and far from any rocks. A much more interesting collection of plants was found in the deep, sheltered river gorges. Fringing the waterside at Saltwater River were *Hymenanthera Banksii*, *Callistemon salignus*, the 'River Bottle-brush,' and *Leptospermum lanigerum*, the 'Woolly Tea-tree,' all of which also occurred in the Deep Creek. Among the rocks the little 'Creeping Spurge,' *Euphorbia Drummondi*, and the Sickle Fern, *Pteris falcata*, were collected. The Hop-bush, *Dodonæa viscosa*, the Elder, *Sambucus Gaudichaudiana*, the 'Sea Celery,' *Apium prostratum*, the 'Sweet Tobacco,' *Nicotiana suaveolens*, the 'Indian Weed,' *Siegesbeckia orientalis*, were, except the first, all blossoming. Two alien plants, *Salvia verbenacea*, and the 'Thorn Apple,' *Datura stramonium*, were freely growing near the 'Organ Pipes.' Trees occurring here were the Red Gum, *E. rostrata*, Yellow Box, *E. melliodora*, Ironbark, *E. leucoxylon*, and the Black-wood, *Acacia melanoxylon*. In the Deep Creek the plants were still more varied and interesting. The 'Mutton-wood,' *Myrsine variabilis*, raised itself above the edge of the cliff. Trees, in the shape of those already mentioned and the 'Drooping Sheoak,' *Casuarina quadrivalvis*, were more numerous. The 'Rue Fern,' *Grammitis rutifolia*, was growing robustly and profusely in situations moister than usual. The 'Coast Clematis,' *C. microphylla*, *Bursaria spinosa*, and *Cassinia aculeata*, were also present, and the 'Rosy Storksbill,' *Pelargonium Rodneyanum*, the Verbena, *V. officinalis*, the 'Austral Indigo,' *Indigofera australis* (all three flowering), and the 'Dwarf Skullcap,' *Scutellaria humilis*, were collected. Crossing the granite country to Bulla, the 'Lightwood,' *Acacia implexa*, was dominant. The little Rat-tail Fern, *Asplenium flabellifolium*, was found in large masses at the bases of the boulders, and the trailing Latrobe Glycine was added to our list. From Bulla to the graptolite beds nothing of special interest was seen, but here again in the Deep Creek our interest was quickened by the appearance of well-grown examples of the 'Murray Pine,' *Callitris verrucosa*, the two Myoporums —the 'Boobialla,' *Myoporum insulare*, and the 'Turkey-bush,' *M. deserti*; the Acacias—the 'Gold-dust,' *A. acinacea*, and the 'Hedge' or 'Kangaroo Acacia,' *A. armata*; the

'Hop-bush,' *Dodonæa viscosa*, the Grey Box, *E. hemiphloia*, and last, but by no means least, the charming 'Desert Cassia,' *C. eremophila*. This plant, which is said to have occurred freely along the creek just here, is now only to be seen in situations where it is out of the reach of stock. The 'Coast Twinleaf,' *Zygophyllum Billardieri*, *Eutaxia empetrifolia*, and *Calycothrix tetragona*, mentioned by Mr. C. French, jun., in an account of a previous Club excursion (*Vict. Nat.*, xvii., p. 122) to this creek, were not noticed by us.—C. S. Sutton and P. R. H. St. John."

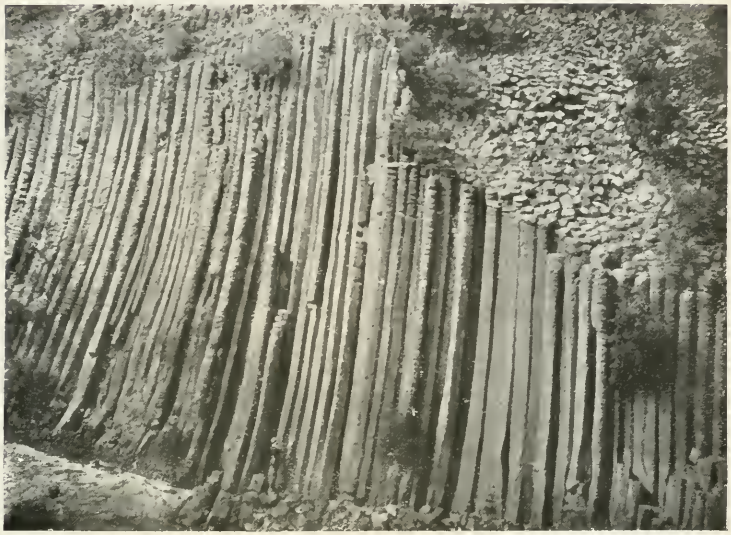
I am indebted to Mr. J. Twyford for the excellent photographs of the "Organ Pipes" and other features of the excursion exhibited to-night. If the picture of the basalt columns be compared with the plate published in the *Naturalist* of November, 1900 (vol. xvii., p. 120), it will be seen that some alteration has taken place in their appearance during the interval of ten and a half years. The flood waters of the Salt-water River have undermined the bases of several of the columns in the centre of the picture, with the result that the whole columns have slipped down at least thirty feet along the vertical joint planes. This picture should be worth reproducing in the *Naturalist* for the sake of comparison and reference.

The weather was perfect for such an outing, and altogether I think that, although the walk amounted to nearly fifteen miles, we had a thoroughly enjoyable and profitable day. The botanical members of the party were delighted to find that the season, although autumn, had caused wild flowers to bloom as if it were spring.—R. W. Armitage.

[At the request of Mr. Armitage, the committee decided to reproduce the picture mentioned above, and also a nearer view of some of the columns shown in the lower right-hand corner of the same picture, which clearly illustrates the regular character of the vertical and cross joints, and which eventually become weathered surfaces like piles of cheeses.—Ed. *Vict. Nat.*]

An interesting supplement, entitled "Hints on the Cultivation of Trees, Flowers, and Vegetables, and on the General Improvement of School Grounds," was issued by the Education Department with the May *Education Gazette and Teachers' Aid*. It consists of articles by different teachers on the several sections of the subject, prepared under the direction of Mr. J. P. M'Lennan, Supervisor of Agriculture, Education Department. Much of the information given will be found useful by the average amateur gardener.

PLATE I.



BASALT COLUMNS, SYDENHAM.

SOME NOTES ON COODE ISLAND AND ITS FLORA.

By J. R. Tovey, Senior Assistant, National Herbarium, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 8th May,* 1911.)

Towards the end of the year 1908, and again in 1909, I made several visits to Coode Island, and collected a number of specimens of plants, several of which, on examination, proved to be exotics, and had not been previously recorded for Victoria. I was accompanied on some of these trips by Mr. C. French, jun., Assistant Government Entomologist, who had informed me that, whilst roaming over the island in search of entomological specimens, he had noticed a number of plants growing there which he thought might be worthy of further investigation.

Before enumerating the different species noted, it may be of interest to give a short history of Coode Island, which was originally a portion of that low-lying, sandy tract along the south bank of the Yarra, towards its mouth, known as Fishermen's or Sandridge Bend. In 1886, by the cutting of a ship-canal from one portion of the Yarra to another (by which the distance by water from the city to the sea was lessened by nearly two miles), the area was bisected, the northern portion becoming a somewhat triangular-shaped island of about 240 acres in extent, and having that part of the old course of the Yarra, known as "Humbug Reach," for its northern and western boundaries. The canal, which is 100 yards wide, and of sufficient depth for vessels of about 10,000 tons, forms a considerable barrier to animal or vegetable life. The water was allowed to pass through the canal on the 11th of September, 1886.

Through the kindness of Mr. J. Saxton, of the Lands Department, in allowing me access to some survey maps of that part of the metropolis in which Coode Island is situated, I was able to glean some interesting information about the original condition of the area now forming the island, and of the adjacent land. A survey plan made about 1840 shows "Tea-tree scrub" on both banks of the river, and the major portion as "swamp land." At this time that part of the Yarra below its junction with the Saltwater River was known as "Hobson's River." In a later map (1841) the river now known as the Saltwater was given as the "Macedon River." The traffic along the road from Geelong to Melbourne at this time crossed the Macedon River (now Saltwater River) by means of a punt, about a quarter of a mile above its junction with the Yarra. A few years later a survey plan shows three formations—namely, tea-tree scrub, sandy waste, and a fringe of forest. The canal afterwards cut off the tree-clad portion.

The appearance of the island since its formation has undergone a complete change. The tea-tree scrub has disappeared, the swamp has been practically filled up, and the greater part covered by members of the Ficoideæ (Mesembryanthemum, &c.), whilst another area is laid down in grass. The island is chiefly used as a quarantine station for stock; but several buildings have been erected there, which, however, are not very artistic, having been constructed mainly of galvanized iron. These buildings are intended to be used as a sanatorium for bubonic plague patients when necessity arises. This fact might deter members of the Club from paying a visit to the island. Nevertheless, a trip to the locality would well repay the trouble taken, not only to the botanist, but also to the entomologist, and probably to the conchologist and geologist as well.

The numerous salt-marshes are swarming with pond-life, and are worthy of a thorough search by those of our members who are interested in the study of that department of science. Mr. French, jun., informs me that he collected here some specimens of mosquito larvæ (millions of which are to be found in these salt-marshes), which he reared, and forwarded to Dr. L. O. Howard, Chief Entomologist of the United States of America, for naming. These were described as a new species, under the name of *Culex labeculosus*, the Salt-marsh Mosquito.

I am also indebted to Mr. French, jun., for the following entomological notes:—An interesting scale insect was found on the Salicornia, which also proved new to science, and has been named by Mr. E. E. Green, of Ceylon, *Pulvinaria salicornæ*, the Salicornia Scale. On the Coast Acacia, *Acacia longifolia*, the common black flat scale, *Aspidiotus rossi*, is very plentiful, and on the Black Wattle the wattle scales, *Prosophora acaciæ* and *Lecanium baccatum*, are fairly numerous. In and on the dead acacias the following longicorn beetles were found:—*Hebecerus marginicollis* and *H. australis*, *Adrium artifix*, *Pempsamacra pygmæa* and *P. dispersa*, *Pachydissus sericeus*, and several other small species of longicorns, also the common Wattle Goat Moth, *Zeuzera eucalypti*.

In the south-west corner adjoining the canal the land is somewhat higher than the surrounding portion. This is apparently caused by the deposition of ships' ballast, which has evidently been brought from other countries—certainly, to some extent, from South Africa, for many of the exotic plants found on this portion of the island were natives of that part of the world. This gives an idea of the way in which some of our alien plants may have reached our shores.

The portion of land before mentioned is about 250 or 300 yards long and approximately 30 yards broad at its northern end, becoming narrower towards the south. This was covered

with a mass of foreign vegetation, thus giving it a unique appearance.

Two introduced members of the Cruciferæ found growing there are worthy of mention—*Brassica campestris*, L., the Rape or Wild Turnip, and *Diplotaxis tenuifolia*, D. C., Sand Mustard or Rocket. The latter is a native of Europe. This was the second locality recorded in this State for the Sand Mustard. Some of the roots of *D. tenuifolia* were found to have penetrated the loose ballast to a depth of at least three feet.

Among the Compositæ may be mentioned *Ursinia chrysanthemoides*, Harv., a native of South Africa, which is only known in this State from this locality. It was growing in great profusion, and when seen from a distance whilst in flower it reminded one of a field covered with Cape-weed, *Cryptostemma calendulaceum*. It has somewhat the habit and appearance of some of the chrysanthemums, and hence arises the specific name. I brought away some of the young plants of the Ursinia, and planted them in my garden; but they seeded so freely and spread so rapidly that I had to pull them up, or they would have taken possession of the garden.

Another immigrant from South Africa, *Dimorphotheca pluvialis*, Moench., like the preceding one known only from Coode Island, was fairly plentiful, as was likewise *Matricaria globifera*, Fenzl., the Globe Chamomile. This South African composite has since been found near Geelong, and is therefore apparently establishing itself as a naturalized alien around Port Phillip. Another South African plant, *Berkheya* (*Stobæa*) *rigida*, Thunb., African Thistle, noted from this locality, like the preceding one, has since been received from Geelong district, and is now classed as a naturalized alien in this State (see "Weeds, Poison Plants, and Naturalized Aliens of Victoria," page 73). Two other composites—*Matricaria inodora*, L., Scentless Chamomile, and *Senecio nebrodensis*, L., var. *glabratus*, D. C., natives of Europe and Asia—were also noted for the first time in Victoria.

Three members of the Ficoideæ indigenous to South Africa were noted—*Tetragona fruticosa*, L., *Tetragona decumbens*, Mill., and *Mesembryanthemum angulatum*, Thunb. These covered the ground in a thick mass, the branching stems trailing out in all directions. A member of the Zygophylleæ endemic to South Africa was *Zygophyllum sessifolium*, L. This plant, with its yellow flowers, looked rather pretty, and I took some of the young plants to grow them in my garden; but, like the Ursinia, I had to pull it up, for it soon began to spread all over the garden, and, as it seeded freely, it would probably have eventually spread outside if unchecked.

One of the Rock Roses, *Cistus salvifolius*, L., a stranger

from the Mediterranean region, was also growing on the island, which is, up to the present, its only known locality in Victoria.

The following plants, which are recognized as naturalized aliens in other parts of Victoria, were also found growing profusely:—The Sun Spurge, *Euphorbia helioscopia*, L., the Petty Spurge, *Euphorbia peplus*, L.—both are introductions from Europe, and are weeds of waste places; the Bermuda Pig-root, *Sisyrinchium Bermudiana*, L., a native of America—a weed injurious to stock if eaten in quantity; the Weld or Wild Mignonette, *Reseda luteola*, L., a dye plant, but a weed when wild; the Salsify, *Tragopogon porrifolius*, L., a native of Europe, Asia, and Africa—a weed when wild; and the Stinking May Weed, *Anthemis cotula*, L., a noxious weed.

The following plants, proclaimed thistles under the *Thistle Act* for the whole State, were found to be flourishing there:—The Shore Thistle, *Carduus pycnocephalus*, L., *Carduus* (*Silybum*) *Marianus*, L., Spotted Thistle—both are sometimes considered to be useful fodder plants in some districts, but their evil effects far outweigh their usefulness; the Spear Thistle, *Carduus lanceolatus*, L.—this species is sometimes wrongly called "Scotch Thistle," the true Scotch Thistle being *Onopordon acanthium*, L., which has not as yet made its appearance on the island; the Malta Thistle, *Centaurea melitensis*, L., one of the Star Thistles; and the Bind-weed, *Convolvulus arvensis*, L. The last-named plant is a perennial, with annual twining stems. It is a troublesome weed in cultivated ground, gardens, and crops; its seeds are poisonous.

Among the introduced grasses noted the following may be mentioned:—*Bromus mollis*, Soft Brome Grass, and *Bromus maximus*, L., Great Brome Grass—both have slight fodder value when young; *Phalaris canariensis*, L., Canary Grass, which also has slight fodder value, but cage-birds are very fond of its seed; *Dactylis glomerata*, L., Cocksfoot Grass, a native of Europe, Asia, and Africa, and one of our best introduced pasture grasses; and *Setaria nigrirostris*, Durand and Schinz., Black-beaked Setaria, a native of Africa, a useful perennial pasture grass, especially on poor sandy or calcareous soils. The foregoing grasses are all recognized naturalized aliens in other localities in Victoria.

Of the native plants noted the following are worthy of mention:—*Acacia longifolia*, Willd., Coast Acacia; *Muehlenbeckia adpressa*, Meiss., Climbing Lignum; *Vittadinia australis*, A. Rich., the New Holland Daisy; *Frankenia pauciflora*, D. C., the Smooth Sea-heath; *Suæda maritima*, L., The Sea-blite; *Myoporum viscosum*, R. Br., and both the Angular and Rounded Pigfaces, *Mesembryanthemum æquilaterale*, Harv., and *M.*

australe, Soland. These last-named plants had evidently been planted. The native plants were found scattered over the island.

The Small Pigface, *Mesembryanthemum tegens*, F. v. M., was also growing on the island, but it was observed to be more abundant on the area on the northern side of the Yarra, known as the West Melbourne Swamp. This plant was for some reason omitted by Baron von Mueller from the "Key to Victorian Plants," published in 1885, though known many years before However, Professor Ewart referred it to the Kew Herbarium in 1908, and had it returned as a good species not known from anywhere else.

A full list of the new introductions mentioned herein is given in Professor Ewart's "Contributions to the Flora of Australia," No. 11, in the *Proceedings of the Royal Society of Victoria*, vol. xxii. (1910), p. 6. Probably later investigations will reveal still further additions to the introduced flora of the State.

In placing these few brief notes before the members of the Club, I have endeavoured to show that the botany, as also the entomology and pond-life, are both varied and interesting. and I would suggest that a Club excursion be arranged to visit this locality, when I have no doubt members will find much to attract their attention.

In conclusion, I desire to express my thanks to Mr. C. French, jun., for his interesting entomological notes, to Mr. Saxton, of the Lands Department, for the trouble he took in searching for the early survey maps, &c., and to Mr. Geo. Kermode, M.C.E., of the Public Works Department, who kindly obtained for me some records relating to the construction of the Coode Canal.

BOOK NOTICES.

THE BIRDS OF AUSTRALIA. By A. H. S. Lucas, M.A., B.Sc., and W. H. D. Le Souëf, C.M.Z.S., M.B.O.U. 498 + xii. pp. ($8\frac{1}{2}$ x $5\frac{1}{2}$), with 6 coloured plates and about 200 illustrations. Melbourne: Whitcombe and Tombs Limited. 21s.

THIS handsome book has been issued as a companion volume to the same authors' "Animals of Australia," noticed in these columns nearly two years ago, and fully maintains the high character of that work. The volume has been written more for the naturalist than for the general reader; but, as it is so fully illustrated, the latter cannot help being interested. There is hardly a page without an illustration of some kind—either a bird (from life or from a museum specimen), a nest, or a full-page scene showing the birds in their natural habitat. The coloured

plates are dainty specimens of Mrs. Ellis Rowan's work, and are devoted to some of our gayer-plumaged birds, such as the parrots, finches, honey-eaters, warblers, and bower-birds. The systematic arrangement adopted is that of Sharpe's "Hand-list of Birds," adapted to Australian birds by Mr. Gregory Mathews (*Emu*, 1908). When necessary, other publications have been levied on for information and illustrations, among them the *Victorian Naturalist*. Unfortunately, to bring the work within a reasonable compass, as every Australian bird is recorded, only a limited amount of space could be given to popular remarks about some of the more remarkable species. The general plan of the work is to take each order in succession, give a key to the different genera; take each genus, and give a key to the various species, then add any additional description necessary under each bird, such as its range, the prominent features in its plumage, its measurements, and, in some cases, a description of the nest and size of the eggs. The volume is well indexed, in various ways. The table of contents lists the birds under their ordinary group names, the vernacular index extends to ten pages (double columns), an index of scientific names fourteen pages (also double column), and a systematic table of twenty-three pages, which again includes the vernacular names, and is itself indexed, so that the student should have no difficulty in turning to any species required. A useful chapter on the birds which have been introduced and liberated in Australia is included. The volume has been splendidly produced on heavy paper, well calendered, and weighs $2\frac{3}{4}$ lbs. The work is one that Australians should be proud of, and those who cannot afford the magnificent work now being issued by Mr. Gregory Mathews will find in it an efficient substitute. No fault can be found with the printing, and we trust the enterprise of the publishers will have its due reward. The volume should find a place on every naturalist's bookshelf and in every public library throughout the Commonwealth.

An Australian Bird Book. By J. A. Leach, M.Sc., Organizing Inspector of Nature Study, Education Department, Victoria. With map and 93 plates (20 in colours). 204 pp. ($7\frac{1}{2}$ x 5). Melbourne: Whitcombe and Tombs Ltd. Price, 3s. 6d.

The author of this little volume, designed specially as "a pocket book for field use," has succeeded in producing probably the most unique bird book yet published. The success of the author's "Descriptive List of the Birds Native to Victoria," published by the Education Department about two years ago, led to a series of illustrated articles in the *Education Gazette and Teachers' Aid* (Education Department, Victoria), which were also greatly appreciated. In his latest effort Mr. Leach, while

dealing mainly with the birds of Victoria, has by various references so enlarged his subject that the volume may almost be called a condensed catalogue of the world's birds. At any rate it is easy to trace, by the method adopted, the systematic position of any Australian bird among the birds of the world, and the proportionate number of species of any family occurring in Australia. Side by side with the systematic matter runs what the author terms a lecture, which contains an immense amount of information so clearly and pleasantly put that it cannot fail to interest and instruct. The unique feature of the book, however, are the coloured plates. These contain figures of 175 birds, so accurately coloured that no detail seems to have escaped the eye of the artist, Miss Ethel M. Paterson, while the printing is a splendid example of three-colour work. When it is borne in mind that the largest figure, that of the Wedge-tailed Eagle, is little over three inches in length, while the Pardalote is just over an inch, and that all will bear the closest scrutiny, the prominence of this feature cannot be denied. In addition, there are 73 plates in black and white, containing about 400 figures; thus a figure is given, either coloured or plain, of every bird, while sometimes both sexes are given. Full details as to 395 Victorian birds are given, also of a few introduced species which have become fairly common. These details consist of vernacular names, scientific name, range, brief general description, rarity or otherwise, habitat, food, size, &c. The author appeals to Australians to protect their bird fauna, the most interesting in the world, and far from being songless, as often asserted. The Director of Education, Mr. F. Tate, M.A., I.S.O., has written a sympathetic and appreciative introduction, and it is gratifying to learn that large orders for the work have been received from the Education authorities of the other States, where, as well as in Victoria, a copy is to be supplied to every State school. No Victorian nature student can afford to be without this handy volume, which we hope is only the first of a series badly needed in the interests of our plants, insects, shells, &c.

Handbook of Destructive Insects of Victoria, Part V. By C. French, F.E.S., Government Entomologist. Melbourne: J. Kemp, Government Printer. 2s. 6d.

We are glad to welcome another part of Mr. French's useful work on the destructive insects of Victoria, which is quite up to the high character of the earlier parts of the publication. As in parts 3 and 4, the author includes descriptions of several of our larger birds which make insects the principal article of their diet. Among these are the White Ibis, White-fronted Heron, Australian Bustard or Wild Turkey, and the Giant

Kingfisher—more familiar under the name of Laughing Jackass, which is happily being gradually supplanted by Kookaburra, presumably a native name. The insects dealt with include twenty-seven species, ranging through the various orders. Of beetles, several of the longicorns, so destructive to timber, are described, and plates given of their life-histories, but perhaps the most remarkable insect figured is a scale found on the She-oak, which was named by Maskell after the author some years ago. Its life-history, which is too long to reprint here, has been recently worked out, and reads like a fairy tale, fully entitling it to be regarded as perhaps the most wonderful insect in the world. As usual, hints on means of destruction, &c., are included in each chapter. One of the insects described, the Greater Vine Scale, bids fair to become the scourge of suburban gardens, having greatly extended its sphere of operations during recent years. We are glad to learn that though Mr. French has now ceased to be attached to the Department of Agriculture, having exceeded the age limit, the Minister has acceded to his request to be allowed to finish the work as originally planned, and that the final part will be issued in the course of a month or two. With this part the author will have described about 130 insects and 40 birds, and the work will remain for all time as a monument of Mr. French's enthusiasm, the only regret being that owing to lack of funds it has taken rather more than twenty years to accomplish. The illustrations have been beautifully printed in colours by Osboldstone and Co., the Government Printer being responsible for the complete work.

The month of June, 1911, will long be remembered by residents in the Yarra valley on account of the long-continued flood, which in many places lasted for more than a fortnight. The lagoons at Willsmere, well known to the pond-life hunters of the Field Naturalists' Club, were covered by at least ten feet of water during the whole of the time. According to an article in the *Argus* of Saturday, 1st July, the great influx of fresh water into Port Phillip Bay has had the effect of killing quantities of the smaller forms of crustacea, &c., along the eastern shore of the bay, particularly at that usually prolific collecting ground, near Black Rock, known as "Quiet Corner." It will be interesting to note what effect the flood will have on the pond-life of the coming season.

The first portion of the provisional list of common names for Victorian plants was published in the *Journal of the Department of Agriculture* for June. The committee will be pleased to receive critical remarks and suggestions from persons who consider that improvements can be made in any of the names. Correspondence should be forwarded to the hon. sec., Dr. C. S. Sutton, Rathdown-street, North Carlton.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th July, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From the Chief Inspector of Fisheries and Game, Department of Agriculture, notifying that the southern extremity of Dandenong State Forest, from Monbulk Creek (east branch) to the Forest Falls, on its tributary, Hardy's Creek, together with the Crown lands frontage to the southern side of the creek, and also the water reserve, has been proclaimed a sanctuary for native game by an order of the Governor-in-Council. The letter was received with applause.

REPORTS.

A brief interim report of the excursion to Keilor on Saturday, 8th July, was given by the leader, Prof. E. W. Skeats, D.Sc., who promised a more detailed account at a later date. The party, which comprised about seven members of the Club and eighteen University students, had spent an interesting day studying the various geological features of the district.

A report of the excursion from Fairfield to East Camberwell, on Saturday, 24th June, was, in the absence of the leader, Mr. J. A. Leach, M.Sc., given by Mr. F. G. A. Barnard, who said that an unpropitious afternoon had been responsible for a small attendance of members. However, they had noted the junction of the basaltic and silurian formations near the Fairfield railway bridge, and the indications of an old river-bed shown in the cutting in the Asylum grounds. The extent of the Yarra flood, which was then showing signs of falling, astonished some of the party, and photographs of it were secured. Owing to heavy rain the walk had to be abandoned before reaching East Kew, and shelter sought.

A report of the junior excursion to the Government Entomologist's Department on Saturday, 1st July, was forwarded by Mr. C. French, jun., Acting Government Entomologist, who had spent about a couple of hours in explaining the various objects of interest to the fifteen juniors who attended.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. R. A. Keble, "Bonnie Brae," Alma-road, Camberwell, Mr. Leopold D. Meyer, "Heim

Ruhe," Milroy-street, North Brighton, Mr. Wm. M'Gowan, Enid Nursery, Ivanhoe, and Mr. Chas. Stout, Gillies-street, Fairfield, were duly elected members; and Miss Marjorie Hooper, Footscray, Miss Grace Turner, Yarraville, and Miss Amy Thomas, Droop-street, Footscray, as junior members of the Club.

GENERAL BUSINESS.

Dr. T. S. Hall, M.A., inquired as to the constitution of the Plant Records Committee. He understood it was a sub-committee of the Field Naturalists' Club, and, if so, the recently published first instalment of the provisional plant names in the *Journal of the Department of Agriculture, Victoria*, for June, should have been accompanied by some reference to the work as having been initiated by the Club. Professor Ewart, as chairman of the Records Committee, explained that, in the introduction to the list published, the names of the individual members were given. The secretary said that this was so, and was, so far satisfactory to the individuals; but there was nothing to show the general public that the work was practically the work of the Field Naturalists' Club, assisted by the Department of Agriculture. Further discussion was postponed.

PAPERS READ.

1. By Mr. P. R. H. St. John, entitled "Notes on the 'River White Gum,' *Eucalyptus radiata*, Sieber."

The author drew attention to the confusion existing in the references to this tree and *E. amygdalina*. He claimed that it was distinct in leaves, sucker leaves, umbels, &c., and should have specific rank, and exhibited specimens of *E. amygdalina*, *E. dives*, and *E. radiata* in order to support his contention, the difference between *E. amygdalina* and *E. dives* being less marked than that between the former and the species under discussion.

Professor Ewart, D.Sc., Ph.D., F.L.S., remarked that, while Mr. St. John's energy and earnestness in this inquiry were fully appreciated as evidence of the kind of work that was much needed, still he would urge caution before accepting the conclusions put forward, and reminded members that Bentham, who had relegated this tree to varietal rank as *E. amygdalina*, var. *radiata*, was a botanist whose decisions should be challenged only after the greatest care and deliberation. He added that, after Bentham had gone through the whole genus Eucalyptus, he set aside his results and began *de novo* in order to have a thorough check on his work. The individual interpretation of what constituted a species would always be a stumbling-block. He thought that, though the author had

raised some interesting points, the question should still remain open.

Mr. F. Pitcher congratulated the author on his having noted the varying conditions, which hitherto had been recognized only in New South Wales.

Mr. F. Chapman, A.L.S., said that the present discussion reminded him of some leaf-casts of a Eucalypt which had been found in ironstone at Stawell, Victoria, and dated back to Eocene times. These leaves, he had found, compared well with *E. amygdalina*, but Mr. R. T. Baker, F.L.S., thought they approached nearer to *E. dives*.

Mr. St. John briefly replied.

2. By Mr. G. A. Keartland, entitled "The Alteration of the Quail Season and its Effects."

The author showed how the Fisheries and Game Branch had from time to time been transferred from department to department, with little rest; but now it had acquired a new status under the Department of Agriculture. He referred particularly, as a naturalist and a sportsman, to the many alterations of the quail season. On the opening day of the present season he had gone out with his gun, and had come home ashamed of what had happened in the sporting field that day. The opening day was too early in the year, and, in view of the history of the struggle that had extended over about twenty years, which he had in memory, he urged that the old date of opening be re-adopted.

Professor Ewart and Mr. A. D. Hardy spoke, and in reply Mr. Keartland stated that quail, in captivity, were almost omnivorous; but that, though their food in the fields varied, their principal diet was grass-seeds and insects.

The meeting resolved, on the motion of Messrs Pitcher and M'Lennan—"That, when published, copies of the *Victorian Naturalist* containing Mr. Keartland's paper be forwarded to the Department of Agriculture, with a letter urging further consideration of the question."

NATURAL HISTORY NOTES.

Moth attracted by Jam.—Mr. A. D. Hardy, F.L.S., read a short note on a Bogong Moth, *Agrotis spina*, which, so late in the season as the 1st of June, had fluttered about his dining-room, first attracted by the incandescent gas-light, next by the white table-cloth, and finally found its way to an open glass dish of plum jam, of dark red colour and rather syrupy consistency. Here it stayed fully twenty minutes, on the edge of the dish, its long tongue inserted in the syrup, and was so voracious that it did not seem to mind being touched. During the period it several times left the jam, and walked about on the edge of the dish, but in less than a minute renewed feasting.

Owl and Bright Light.—Mr. F. Wisewould told of an owl which had flown with considerable force against a mosquito-netted window at his country house, and remained fluttering there for some time, and asked whether it was not an unusual occurrence. Mr. G. A. Keartland said that the bird was probably a Podargus or a White-throated Nightjar in pursuit of moths, and had thus been led to the light, which it would otherwise have avoided. He had often seen these birds pursue moths close to a camp-fire in the bush.

Mr. J. S. Kitson, by way of recording the recent excursion to the Clifton Hill Quarry, drew attention to his exhibit of a large series of specimens collected in the quarry at various times. He said that on the recent visit the members had been particularly interested in the bed of water-worn sand and gravel exposed under a thickness of some ninety feet of basalt, indicating that the molten material had filled up the bed of an ancient river, and also in the pieces of charred wood found, showing that trees had been growing on the river-banks at the time. The quarry had been so fully described in other excursion reports that it was not necessary to enter into further details.

The President called the attention of members to the forthcoming conversazione and exhibition of wild flowers, fixed for 26th and 27th September, and said that, to make the display a success, members should give early notice to the secretary of what they proposed to exhibit, and commence at once on the preparation of their exhibits.

EXHIBITS.

By Mr. R. W. Armitage, M.Sc.—Specimen of the twisted-box shell, *Arca tortuosa*, from Townsville, North Queensland.

By Mr. C. J. Gabriel.—Marine shells, *Voluta fulgetrum*, from South Australia, and *V. rossiniana*, from New Caledonia.

By Mr. J. S. Kitson. — Minerals, &c., from Clifton Hill Quarry, in illustration of excursion report.

By Mr. P. R. H. St. John.—Dried specimens of *Eucalyptus amygdalina*, *E. dives*, and *E. radiata*, in various stages, in illustration of paper.

After the usual conversazione the meeting terminated.

Cut-worm Moths.—In the *Journal of Agriculture of Victoria* for July Mr. C. French, jun., Acting Government Entomologist, has an interesting article, entitled, "Insects Destructive to Crops—Cut-worms," illustrated by coloured figures of seven species, including the Bogong Moth, *Agrotis spina*, which in some seasons appears in countless numbers. The life-histories are traced, and remedies given for the destruction of the caterpillars.

A CYCLE TRIP THROUGH EAST GIPPSLAND.

By H. B. WILLIAMSON.

(*Read before the Field Naturalists' Club of Victoria, 12th June,* 1911.)

DURING the recent Christmas holidays I took the opportunity of visiting East Gippsland, the Lakes district, and the vicinity of the Snowy River. I wanted to see, in their native habitat, the plants I had become familiar with by means of either dried or freshly-picked specimens sent to me by collectors at Orbost—Messrs. J. Rowe, E. Pescott, and C. H. Grove. I also wished to get a knowledge of the birds of Gippsland.

Leaving Melbourne by early train on Thursday, 29th December last, I arrived at Bairnsdale early in the afternoon. Cycling to Swan Reach, on the Tambo River, 13 miles distant, I found the road good, but uninteresting from a botanist's point of view. On the roadside near Bairnsdale I gathered the Crab-grass, *Eleusine cruciata*, and, in a flooded depression, *Damasonium australe*. Just as I arrived at Swan Reach a little river steamer was coming down from Mossiface. The bridge was "up," and I was just in time to get a picture showing the steamer passing under the bridge, which had been lifted in two parts by hydraulic pressure. I have seen no prettier river than the Tambo, and I advise anyone who has time when at Bairnsdale to make the trip up to Mossiface.

I made Nowa Nowa for breakfast next morning, getting a lift in a waggonette whose driver wanted company. I could have driven all the way to Orbost with him, but preferred staying to look around till dinner-time. A stream, misnamed Boggy Creek, here flows into an arm of Lake Tyers, which winds up from the beach near Cunninghame. The hotel here is the "half-way house" for Cunninghame to Buchan passengers, the coach from Buchan and the motor launch from Cunninghame meeting here at dinner-time. About the time of my visit it was a busy time for the hotelkeeper and his wife and daughters —especially the latter. Twenty people sat down to dinner on the day I was there, and I must say the meal was a credit to the management, though some of us did not get the courses in rapid succession. I spent the morning noting the vegetation. It was too late for many of the plants, but nice blooms of *Tristania laurina* and *Trachymene Billardieri* were obtained. *Prostanthera hirtula* also was common, but going off bloom. I collected on the high banks the Oat-grass, *Anisopogon avenaceus*—a tall, coarse species that I had not met with before. The specimens of Kangaroo-grass, *Anthistiria ciliata*, and *Agrostis rudis*, associated with the Oat-grass, were very fine. Some tall shrubs of *Leptospermum attenuatum* grow just behind the hotel, but fruit only was to be found on them. I

feel sure the vicinity of this creek during the month of November would yield a fine "bag" to the collector.

In the afternoon I cycled to Orbost, passing two houses of accommodation on the way—and I may here mention that these places, from what I saw and what I was told, are fairly plentiful in East Gippsland, so that tourists need not fear having to camp out when not prepared for it. At intervals, "patches" of Bell-birds or Bell Miners, *Manorhina melanophrys*, occur, the fascinating notes—not unlike those obtained by striking a glass tumbler—coming with incessant tinkling from creek bottoms and swamp margins. The note of this bird is not so full and liquid as that of the Crested Bell-bird, *Oreoica cristata*, of Northern Victoria, which displays, in addition, a wonderful ventriloquial power. A new acquaintance I also made in the Spotted Ground-bird—suitably named, for it rarely leaves the ground and logs. When it does fly, it rises with a noise like that of a quail's flight, hence one of its local names—"Quail Thrush." At Hospital Creek I came across large specimens of *Alisma plantago*, Water Plantain, associated with Water-Ribbon, *Triglochin procera*, and Floating Pond-weed, *Potamogeton natans*.

The approach to Orbost is down a steep road cut round a limestone bluff. The view of the Snowy valley from this bluff is very fine. One sees miles of level alluvial flats covered with a staple product—maize—7,000 acres being under that crop this season. About 300 acres of beans, chiefly Canadian Wonder, were also coming on. Dairying is an important industry of the district, 300,000 lbs. of butter fat having been sent to Orbost factory, and £13,000 distributed to suppliers, during 1910. Since my visit, however, I have heard that much destruction has been wrought by the floods, many acres of the maize and beans being rendered valueless.

The first thing that impressed me as I rode along the tracks on the flats was the luxuriance of the introduced alien plants. The land not actually under cultivation is a forest of thistles (chiefly Spotted Thistle, *Carduus marianus*), nettles, docks, horehound, and numerous pests that are found in all well-watered places. Thorn Apple, *Datura stramonium*, is very abundant, and in the low parts near the junction of the Brodribb and Snowy Rivers, where the influence of the tide is in evidence, Celery-leaved Crowfoot, *Ranunculus sceleratus*, is spreading. Up the river from the bridge I saw, for the first time, the Great Mullein, *Verbascum Thapsus*, a plant 6 feet high, with leaves 18 inches by 7 inches.

For miles along the river, towards the mouth, the track, just wide enough for a cart, runs between a forest of thistles and blackberries, and, where one can see over and through

these, there are the maize fields on one side and on the other side the river, lined with its tangle of *Acacia melanoxylon*, *Eugenia Smithii*, *Sambucus xanthocarpa*, *Myrsine variabilis*, and now and then *Eucalyptus botryoides*, with their attendant parasites and climbers, Lyonsia, Vitis, Smilax, and Clematis.

Along the river banks tall willows, *Salix alba*, give the river an additional beauty. In many places these quite hide from view the water of the river. A steamer was manœuvring just below the bridge, and I could not get a sight of it till I went down the bank to the water's edge. The planting of these trees is a good idea, both for the sake of ornament and from an economic point of view. The roots must aid materially in resisting erosion of the banks. I was interested in the maize cribs—open structures of wood and wire-netting, in which last season's cobs are stored pending a higher price. In almost every paddock one of the buildings was to be seen, and in many cases they were nearly full of cobs. One, which Mr. Rowe informed me was considered the largest in the Commonwealth, measured 450 feet long, 7 feet wide inside, and was filled to the height of 10 feet with cobs. The value of the whole Mr. Rowe worked out as £1,300, at the present low price of maize.

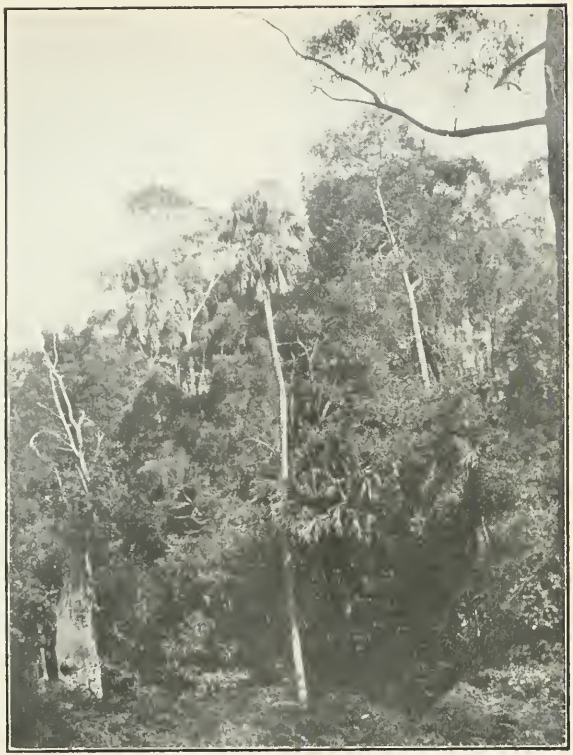
On Saturday, the 31st, I cycled to Marlo, at the mouth of the river. This is a watering-place on the fern-covered sand hummocks, and has a hotel and a couple of boarding-houses. I was two days too soon to see all Orbost, or a great part of it, disporting itself on the beach and holding regatta and sports on New Year's Day. One cannot reach the sea-beach without a boat, for the ocean has thrown up a sand ridge which stretches for miles along parallel to the coast, and shuts out the ocean beach even from view, though, of course, one can hear the roar of the waves. Round Marlo, Mahogany Gum, *Eucalyptus botryoides*, is the prevailing timber tree. Stunted Messmate, *E. obliqua*, and *Banksia serrata* form a dense forest on the fern-clad hummocks.

From Mahogany Gum good crops of honey are obtained, as I learned from a young beekeeper whom I interviewed. His apiary of standard hives, nicely painted and arranged, his tidily kept bee-yard, and well-filled though small honey-house, showed him to be an up-to-date apiarist. Several other apiaries are to be seen at Orbost. The local chemist is an enthusiastic beekeeper, but I had not the good fortune to find him at home when I called.

I was aware that about 10 miles east of Marlo, on the Cabbage-tree Creek, was to be seen a unique patch of vegetation known as "The Palms," so I made inquiries. I met with little encouragement from those from whom I inquired until I interviewed the landlord of the hotel. I started off under his

directions, but rode on past the spot, and, as it was too late to do any exploring, I turned back. Being very keen on reaching the place that has attracted so many botanists since Baron von Mueller's first trip there, I rode out again on New Year's morning, starting at 5 o'clock, and taking more explicit instructions from my host. In case anyone interested may have a chance to visit the locality, I may as well go into details with regard to the track to be followed. From Marlo the Bemm River road has to be followed for about 3 miles. This is a well-beaten track, in part sandy, within a few hundred yards of the edge of the coast cliffs, running now and then through forests of *Banksia serrata*, messmate, and mahogany. Occasionally the forest gives place to open plains with low scrub, which, at an earlier season, must be a lovely sight with Hibbertias, Styphelias, Patersonias, Scævolas, and other plants peculiar to the elevated coast plains. The Banksias were alive with Blue Mountain Parrots, *Trichoglossus novæ-hollandiæ*, and Brush Wattle-birds, *Anellobia chrysoptera*—both honey-eating birds, the latter one of the noisiest of honey-eaters. Looking down from the cliff, one sees the sandy ridge thrown up by the south-west current, and forming a lagoon along the coast about 20 chains wide. Probably in time this sand ridge will be really the true coast-line, and will be a high ridge of scrub-covered hummocks. At present the Snowy River has to run along this lagoon to reach the opening in the bar through which it can empty into the sea. The same process is going on here that, in Western Victoria, diverted the Eumerella River, which now flows into the sea near Yambuk, 9 miles further east than it once flowed out. The Merri River, near Warrnambool, is another similar example.

After going down a sandy hill three miles from Marlo, a white, sandy track—the Club Terrace road—is seen running off to the north. This turns east directly, and is followed for about four miles through a forest of tall eucalypts, among which Gang-gang Cockatoos, *Callocephalum galeatum*, appear rather numerous. After crossing three culverts, an unobtrusive notice, "To the Palms," is seen on a tree about 30 yards up from the third culvert. The track then leads to the left over a rise, and then down through a depression till a piece of corduroy, crossing a creek, is reached. After passing this, the track winds round to the right, and about a quarter of a mile on a small open plain is seen to the right. Before this plain is reached we must strike off to the left (no track visible). When a hundred yards are traversed the dark foliage of the lilli-pillies and blackwoods can be seen in Cabbage-tree Creek, which here runs parallel to the track. The road, on the whole, is fair for cycling. There is scarcely a mile that cannot be



PALM, LIVISTONA AUSTRALIS, MART.
(About 90 feet high),
Cabbage-tree Creek, East Gippsland, Victoria.

Photo. by H. B. WILLIAMSON

PALM, LIVISTONA AUSTRALIS, MART.
(About 20 feet high),
Cabbage-tree Creek, East Gippsland, Victoria.

Photo. by H. B. WILLIAMSON.

ridden over. I looked particularly for side tracks that might lead one astray, but saw none. I am pleased now that I failed to find the place the evening before, because, owing to the fine, bright weather, I was able to get what I could not have got with my hand camera on the previous dull evening—good photographs of the palms.

These specimens of *Livistona australis*, and three on the Brodribb River, a few miles further north, are the only known plants of the N.O. Palmæ growing wild in Victoria, and are unique in that they exist so far south and in such an isolated position. They were discovered over 60 years ago by Baron von Mueller under circumstances that remind us that that world-famed botanist was, in the vigour of his manhood, an intrepid explorer, fit to rank with Sturt and Franklin. His solitary rambles through the unexplored wilds of Victoria must have been attended with hardships and privations which we, who follow beaten tracks, can scarcely realize; but some of us, especially those of us who were personally acquainted with him, *can* realize the delight with which he would greet a plant new to science, and the interest he would evince on the discovery such as this was. These discoveries were to Mueller a sufficient reward in themselves for all his hard work. I must say that I felt, when standing among those plants, and thinking of the enthusiast who first saw them, that I was standing on an historic spot. The thought also came to me that it would be no more than was due to the discoverer if the place were securely fenced and marked with a tablet as "Mueller's Park," the palms being henceforth known as "Mueller's Palms."

I am sorry now that I did not spend more time, and thoroughly explore the place, so as to be able to state with reasonable accuracy the number of palms flourishing there. My impression is that the number was limited to perhaps 40 specimens within a space of 8 or 10 acres. They vary in height from 10 to 90 feet. Those about 20 feet high, one of which I photographed, are the most beautiful, while the tall ones shown in the other photograph are brown and withered at the top, probably owing to the absence of the shade enjoyed by the smaller specimens. I looked for seeds and seedlings, but found neither.

Under the palms and tree-ferns, blackwoods and lilli-pillies, the pretty little creek seemed to offer a delightful retreat where one could recline and enjoy the cool shade, and wait quietly for the birds to come about for identification. How sadly was I disappointed, for I had scarcely unwrapped my lunch when I was assailed by thousands of mosquitoes, and was constrained to bolt my food and get on the move to escape the bloodthirsty females.

On one side of the creek there was a real jungle of tangled vegetation, in which native nettles seemed to predominate. Among this I gathered fine specimens in flower of Harvey's Vine, *Sarcopetalum Harveyanum*, with its large, dark, cordate leaves. Near the water's edge I got Mueller's Starwort, *Callitriche Muelleri*. Smilax, Vitis, and Lyonsia were well in evidence.

Two theories have been advanced to account for the occurrence of the palms so far south of a region to which these plants are usually confined. One is that they are relics of a flora once spread over the southern parts of Victoria when the climate was warmer than it is now. This is a difficult theory to accept, for all the conditions present about the spot seem also present in many other parts of southern Victoria. Another theory is that seeds have been carried to this spot from those parts where palms abound. Birds, water, and aborigines have been mentioned as probable agencies in their distribution, but it seems difficult to believe that this is the only favourable spot where the seeds have been dropped. Probably the plants introduced by the agencies mentioned once covered a larger area, and now these are the few survivors, which have withstood the severity of the southern climate, owing to special conditions—aspect, shelter, &c. Perhaps it may be deemed advisable that the Field Naturalists' Club should make inquiries to ascertain whether everything possible is being done to save the Victorian palms.

The next day I cycled to the Brodribb River, about 8 miles east of Orbost, and close to the bridge explored a patch of native vegetation left in the corner of a cultivation paddock. I came across the ferns *Polypodium scandens* and *P. serpens* growing together on a tree trunk. I was also pleased to find some shrubs of the Gippsland Orange, *Acronychia lævis*, though neither flowers nor fruit were obtainable. The leaves have an essential oil with the odour of true orange leaves, and the little fruit (the size of small marbles) are like miniature oranges, with their segments and all. The plant belongs to the Rutaceæ, the same natural order as the orange.

Among this scrub I was pleased to make the acquaintance of the Coachwhip-bird, *Psophodes crepitans*, after some futile efforts to locate it and view it. In a road-men's camp near by, while eating my lunch alone at the rude camp table, I had an experience I shall not readily forget. Two White-shafted Fantails flew round me, and now and again perched first on my shoulder and then on my feet below the table. I would like to have met those road-men. I had quite a brotherly feeling towards them through our mutual friends the fantails.

The next day I rode—or, at least, walked and rode—up to Mt. Buck, on the Bendoc road, but saw nothing of interest till

up on the cutting which winds round the side of the steep hill. Across the road, at intervals, run several watercourses, which flow down into steep, scrub-filled gullies Clambering down one which seemed from the road a typical Otway Forest musk gully, I found a marked difference. The gullies of Otway Forest have not the number and variety of climbing plants which we find in East Gippsland. The appearance of the place, lit up by the summer sun almost overhead, reminded me of pictures I have seen of Brazilian forests, and I thought at once of monkeys and jaguars, and almost found myself expecting to see those animals come climbing along the vegetable cables to look at the intruder in their domain. Plants of the Victorian Passion-flower, *Passiflora cinnabarina*, were here, but none with flowers or fruit.

My next trip was up the Snowy River, about two miles, to an interesting limestone bluff, on the summit of which was an apiary, and from which a lovely view of the Snowy valley could be got. Near its base plants of the rare *Adriana tomentosa* occur, from which I gathered a good supply. Some time ago a land-slip occurred here, part of the bluff being precipitated into the river, blocking the road which runs between it and the river. In company with Mr. Rowe, Young's Creek was visited, with the result that one flowering plant of the epiphytal orchid *Sarcochilus parviflorus* was secured.

My next move was on to Buchan. I found the road good for cycling except that I had to walk a mile or so up a steep hill. By striking off before I came to Nowa Nowa on to a new track which trends north-west and picks up the Nowa to Buchan road, I saved a few miles and a bad hill. The road then led up-hill for 8 miles through a forest of tall eucalypts. I saw no water, no scrub, and consequently very few birds—Magpies, Gang-gangs, and a Pallid Cuckoo or two. Then along the dusty coach-road (Bruthen to Buchan), near Half-way House, a roadside cottage where tea and soft drinks are dispensed, I came to a patch of Red Bottle-brush scrub, *Callistemon lanceolatus*, and a forest of Mealy Stringybark trees, *Eucalyptus pulverulenta*—the former with a few lingering blooms, and the latter with its young leaves quite white, as if dusted with flour. The mealy bloom on these leaves contrasts in a remarkable way with the very dark foliage of the tree generally. It is one of the few eucalypts with opposite leaves on the full-grown tree. From the train, passing near Morwell, the same eucalypt can be observed. The approach to Buchan is like that to Orbost —down a steep hill, only that the hill is much longer at the former place.

The Buchan valley is wide, and flanked by bare hills. The pretty little river, the Buchan, winds through the valley, and

is bordered with tea-tree and willows, while maize fields occupy a limited margin on each side. In botanical work there is nothing of interest to be done at Buchan, but it is really worth visiting for the sake of its beautiful "Fairy Cave." After visiting the cave I felt well rewarded for the long ride.

Next morning I rode to Nowa Nowa, arriving there at noon. While indulging in a swim in Lake Tyers the New Zealand Spinach, *Tetragona expansa*, caught my eye. Large plants of it were growng at the water's edge. The afternoon was very pleasantly spent on the motor launch from Nowa to the south-west end of the lake. The Nowa Nowa Arm, as it is called, winds about for 18 miles, in parts only a hundred yards wide, and its banks, in some parts quite steep, are covered with trees and scrub to the water's edge. I was charmed with the trip, although the shrubs on the banks did not adorn the scenery as they would when flowering a month or two previously.

We were allowed half an hour at the Lake Tyers Aboriginal Station, where, to me, the most interesting sight was the group of black children, and the piccaninnies, whom the young ladies of the party delighted to nurse. Between Lake Tyers and Cunninghame—7 miles—a terrifying thunderstorm broke over me, and thoroughly soaked me, driving me to the shelter of a hotel awhile before reaching the wharf.

Next morning I identified, among the Banksias (*serrata*), the honey-eaters — Yellow-faced, *Ptilotis chrysops*, White-naped, *Melithreptus atricapillus*, and Yellow-tufted, *Ptilotis melanops*.

After gathering a good supply of the Coast-grass, *Zoysia pungens*, I boarded the steamer *Gippsland* for Bairnsdale. The day was perfect as regards weather. Having read of the silt jetties of the Mitchell River, I was now able to see them and realize more fully the action of a rapid, silt-laden river when flowing into a shallow lagoon.

In the afternoon I cycled to Paynesville, 10 miles, and the next day took the steamer for Sale, falling in with Mr. St. John, who was returning from a walking tour to the Mueller River. I then spent three days with Mr. T. A. Robinson, of Dutson, 6 miles from Sale. Dutson is a splendid field for a botanist, and years ago I became familiar with the local plants through the favour of Mr. Robinson and his daughters. I found a few to add to the census of that part, notably *Drosera spathulata* and *Scleranthus biflorus*—the latter probably not recorded for so far south. Mr. Robinson is an enthusiastic orchardist and gardener, and has a number of novelties under cultivation, among which are the tea plant, guava, and persimmon. He is an expert irrigationist, and on his land is a splendid spring capable of supplying about a million gallons of water a day. This, however, it seems probable, will be taken out of his con-

trol and used to give Sale the first-class water supply which is so much needed there.

I reached home on the 10th January, very thankful that the weather had been so agreeable, and that my bicycle had stood the journey so well. I had ridden about 240 miles, and my only tyre puncture was on the last day's ride—to the Ninety-Mile Beach.

I can commend East Gippsland to the naturalist who cycles; but my ideal of a trip to those parts can be summed up thus: a strong, staunch horse, a covered waggonette, food supplies and blankets, and a congenial mate or two.

In conclusion, I may say that, for the sake of brevity, I have omitted to mention a number of plants noted which had already been recorded by Dr. Sutton in his interesting and ably written paper in the *Victorian Naturalist* for February, 1909 (vol. xxv., p. 155), on the botany of the Snowy River district.

THE NOMENCLATURE OF AUSTRALIAN BIRDS.—The July *Emu* contains a long letter from Mr. Gregory M. Mathews, author of the great work on Australian birds now going through the press, on the subject of the systematic names of Australian birds, in which he virtually says that the time has come when the trinomial system of naming must be adapted for scientific purposes. He quotes different authorities, among them Mr. A. J. North, of the Australian Museum, as to the use of the term "sub-species," which has of late years become exceedingly common. Mr. Mathews argues that trinomials are distinctly better than such binomials as—

Oreocichla cuneata, De Vis
,, *heinei*, Cabanis
,, *lunulata*, Latham
,, *macrorhyncha*, Gould,

which he would render thus (Oreocichla having been replaced by Turdus)—

Turdus lunulatus cuneatus, De Vis
,, ,, *heinei*, Cabanis
,, ,, *lunulatus*, Latham
,, ,, *macrorhynchus*, Gould,

showing at once that only one distinct species of Thrush is recognizable, the others being races or varieties inhabiting different areas. Mr. Mathews' suggestion seems reasonable, and saves the use of "var." and "sub-species"; and may even prevent the founding of new species on mere minor details.

NOTES ON THE "RIVER WHITE GUM," *EUCALYPTUS RADIATA*, Sieber.

By P. R. H. St. John.

(*Read before the Field Naturalists' Club of Victoria, 10th July*, 1911.)

For many years I have had this species under observation, and, although some authorities have included it with *Eucalyptus amygdalina*, Labillardiere, I consider it quite distinct.

During the last Christmas holidays I had many opportunities for closely examining it in all stages of growth, and, fortified by the following extracts from well-known authorities, I think I can clearly prove that the "River White Gum," *Eucalyptus radiata*, Sieber, should be raised to specific rank.

Sieber's description is as follows: — "*Eucalyptus radiata*, Sieber.*—Leaves linear-lanceolate, 4 inches long, 6–7 lines broad; veins very fine, confluent at apex, forming a nerve, which is parallel with the margin. Pedicels short. Buds—lid hemispherical, mucronate. Fruit globose, 3 lines in diameter."

In dealing with the eucalypts of Gippsland, A. W. Howitt † refers to varieties *a*, *b*, *c*, *d*, *e*, and *f* of *E. amygdalina*, Labill. Variety *e* is figured, and is described as follows:—"This is the 'Wang-gnara' of the Gippsland blacks. It is found in the eastern part of Gippsland, but, according to my observations, not so commonly as the other varieties of the type. It grows along the rivers and streams, and in moist valleys. It has a smooth, tall, but comparatively slender bole, with a scanty, often rather spreading, head, in which there is frequently a marked absence of foliage. The bark is persistent, and wrinkled only on the lower part of the bole, above which it becomes smooth and almost white. It is of extreme toughness, hence the aboriginal name, 'Wang-gnara.' The seedlings and young saplings have sessile, rather long lanceolar opposed leaves, resembling those of the normal *amygdalina*, but which, in the older trees, become narrow-lanceolar-falcate, attenuated at the stalk, and pointed. The venation is rather indistinct, the marginal vein considerably removed, and the lateral veins very longitudinal. The umbels are on stalks as long or longer than the bud, the lid small and depressed, with a slight point. Buds numerous — 3–20. Flowers normal. Fruit ovate-truncate, with a slightly contracted orifice, compressed, rather narrow rim, and small, weak valves. Compared with samples (for which I am indebted to Dr. Woolls, of Sydney), this appears

* "Observations on the Eucalypts of New South Wales," by H. Deane, F.L.S., and J. H. Maiden, F.L.S. (*Proc. Linn. Soc.*, 1895, vol. x., p. 606).

† *Transactions of the Royal Society of Victoria*, vol. ii., part 1, 1890.

to be the 'River White Gum' of New South Wales — *E. radiata*, Sieber. This seems to be one of those eastern forms of vegetation which are not found further to the westward than the Mitchell River, though this tree individually does not extend beyond the Tambo River. I have observed it at an elevation of 50 feet at Jimmie's Point backwater, 200 feet at the Tambo Crossing, 300 feet at the Murrendel River and at Wangrabell, on the Genoa."

Howitt now goes on to discuss variety *f*—a form which has since been raised to specific rank, and is now known as *E. regnans*. He says :—"This eucalypt, though possessing a specific title, belongs to *E. amygdalina*, and is less removed from the typical form than the varieties which I have designated *d* and *e*."

R. T. Baker and H. G. Smith * describe the "River White Gum," *E. radiata*, Sieber, as follows :—"A fairly tall tree. It has a hard, black bark on the lower part of the trunk, but smooth in the upper portion of the tree. Sucker leaves thin, sessile, or almost perfoliate, much resembling those of *amygdalina*, opposite, narrow, about 3 to 4 inches long, marginal vein slightly removed from the edges. Mature leaves lanceolate, narrow, generally about 6 inches long ; venation not prominent ; intramarginal vein removed from the edge, lateral veins oblique, spreading. Oil glands more numerous than in that of any other species. Flowers very numerous—up to 30 on axillary peduncles. Calyx turbinate, small, tapering to a long filiform pedicel : operculum obtuse ; ovary flat-topped. Fruit small, pilular, 2 (rarely 3) lines in diameter, rim thin, contracted.

"*Habitat.*—New South Wales, on river-banks and mountain ranges of the coast district, but preferring banks of creeks."

They also make the following remarks :—"We are quite in accord with Sieber, the author of the species, that this eucalypt is worthy of specific rank. He was familiar with the tree in the field, and so did not confound it with *amygdalina*, as has been done by recent botanists. Dr. Woolls, who also studied these two trees in nature, remarks ('Flora of Aust.,' p. 239) :—'No one who has had an opportunity of examining both trees in a living state would suppose them to be allied, as they vary so much from each other in bark and habit.' To this we should like to add also that they differ in timber, number of flowers in the umbels, shape of leaves, shape of fruits, and constituents of the oil. On these grounds we differ from those authors who synonymize the species with *E. amygdalina*."

J. H. Maiden † discusses the synonyms of *E. amygdalina*,

* "Research on the Eucalypts," p. 185.

† "Critical Revision of the Genus Eucalyptus," vol. i., part 6, p. 153.

and says :—"*E. radiata*, Sieber, appears to be nothing more or less than a form of *E. amygdalina*, Labill., very common in New South Wales, and I see nothing distinctive enough to warrant its being called a variety. The typical *amygdalina* from Tasmania, with its linear-lanceolate, often thickish, leaves, with hemispherical opercula and hemispherical, usually broad-rimmed fruit, doubtless appeared to Sieber to be sufficiently different from the New South Wales form. Sieber's type probably came from the higher parts of the Blue Mountains (I have matched it completely from the Wentworth Falls to Mount Victoria). The specimens distributed by Sieber have fruits not dead ripe. When they are quite ripe the tips of the valves are slightly exserted."

On page 155, in dealing with variety *numerosa* (*E. amygdalina*, Labill., var. *radiata*, Benth.), he states : — "The Rev. Dr. Woolls * (and on other occasions) protested against *E. radiata*, Sieb. (as he understood the species), being merged in with *E. amygdalina*. It will, however, remain an open question with some botanists as to whether this form is looked upon as a variety or as an independent species. It certainly is closely related to *E. amygdalina*, and different authors hold different views as to the amount of variation necessary to constitute a species ; so that, as far as aboriginal and vernacular names are concerned, it is the 'Kayer-ro' of Sir Wm. Macarthur, the 'White Gum' of Bent's Basin and the Nepean (Woolls, Benth. "Fl.," iii., 203), and the 'Wang-gnara' of Mr. Howitt. It goes under the names of 'River White Gum,' 'Ribbon Gum,' and also 'Narrow-leaved Peppermint.'"

It will be observed that, although Maiden says on one page that he sees nothing distinctive enough to warrant its being called a variety, yet later on he admits that it will remain an open question with some botanists, and merely contends that it certainly is closely related to *E. amygdalina*.

Already varieties *d* and *f*—namely, *E. dives*, Schauer, and *E. regnans*, F. v. M., respectively, as mentioned by Howitt, are now adopted as distinct species. In my opinion, there is at least equal reason for raising *E. radiata*, Sieber, to specific rank, and the main differences between it and *E. amygdalina*, Labill., may be briefly summarized as follows :—

Bark.—

E. amygdalina has a "box-like" bark, fibrous and persistent, not so fibrous as a "stringybark." "Hemiphloiæ" section.

E. radiata has a rough base, then a smooth, white bark. "Leiophloiæ" section.

* *Proc. Linn. Soc. N.S.W.*, v., 448.

Leaves, mature.—

E. amygdalina.—Linear to broadly-lanceolar straight or falcate, 2 to 4 inches long.

E. radiata.—Thin, narrow to broad-lanceolar, grey-green in the young trees.

"Juvenile" or "Sucker" Leaves.—

E. amygdalina.—They are opposite, narrow-lanceolar, sessile, of a light green colour.

E. radiata are opposite, often whorled, narrow-lanceolar, sessile, and in seedlings the under surface is coloured purple (*E. purpurascens*, Link.); the young stems have a rusty-glandular appearance.

Venation.—

E. amygdalina, venation prominent; lateral veins very oblique, long spreading; intramarginal veins removed from the edges.

E. radiata indistinct; lateral veins longitudinal; intramarginal vein considerably removed from the outer margin.

Flowers.—

Small in both species; stamens under 2 lines long, inflected in bud, with small anthers.

Operculum.—

Hemispherical, shorter than the calyx-tube, very obtuse in *E. amygdalina.*

E. radiata.—Hemispherical, pointed, shorter than the calyx-tube.

Buds.—

E. amygdalina are clavate or club-shaped, sometimes glandular.

E. radiata are pointed and more numerous, up to 40 or more being present in the umbels.

Fruits.—

E. amygdalina are sub-globose-truncate, under 3 lines in diameter, contracted at the orifice; rim flat or slightly concave, shortly pedunculate and pedicellate to nearly sessile.

E. radiata, ovate-truncate on a long peduncle, with filiform pedicels, uniform in size, 2 to 2½ lines in diameter, pilular or pear-shaped.

Oils.—The oil obtained from *E. radiata* bears a greater resemblance to that obtained from *E. dives* than it does to the oil from *E. amygdalina*, the only difference between the two former being that the oil of *E. radiata* contains the greater amount of pinene. The oil of *E. amygdalina* differs from both the others in containing less phellandrene, pinene, and peppermint constituent, but more cineol (eucalyptol). The properties of all these oils have been examined by Baker and Smith,* and may be tabulated as follows:—

* "Research on the Eucalypts."

Species.	Yield per cent.	Specific Gravity.	Specific Rotation. $[\alpha]_D$.	Solubility in 70 or 80% Alcohol.	Eucalyptol Content.	Saponification Number.
E. amygdalina	3–4	.90	—10° to —15°	1½ vols. of 70% alc.	20 to 30%	3.76
E. dives ..	2–3	.87 to .89	—60° to —75°	Variable, sometimes sol. in 80% alc.	Absent	2.9
E. radiata ..	1½–2	.87	—75° to —90°	Insol.	Trace	2.8 to 4.4

The specimens exhibited were obtained from near the Bemm and Cann Rivers, also at Hospital and Euchre Creeks, East Gippsland.

CORRESPONDENCE.

A PLEA FOR "NOTES AND QUERIES" IN THE *NATURALIST*.

To the Editor, Victorian Naturalist.

Sir,—I would like to bring under the notice of your readers the following passage from Montaigne's "Essays":—"I would have everyone write what he knows, and as much as he knows, but no more; and that not in this only, but in all other subjects. For such a person may have some particular knowledge and experience of the nature of such a fountain, or such a person, that as to other things knows no more than what everybody does, and yet to keep a clutter with this little pittance of his will undertake to write the whole body of physicks; a vice from whence great inconveniences derive their original."

From time to time members of the F.N.C. are rebuked for not bringing forward observed facts in natural history, particularly by Dr. T. S. Hall, who, in a paper some time ago, pointed out a number of instances where information was wanted by scientists.

Now, it appears to me that a vast amount of that "ungarnered grain" would be husbanded if there was a suitable storehouse for its reception in the pages of the *Naturalist*, under such a heading as "Notes and Queries."

Many of our members must have observed some trait or habit of some particular plant or animal which, though interesting, or may be valuable, is not sufficient of itself to form the matter for a paper, nor yet suitable for contribution as a "natural history note" at the Club meetings; but, put into a paragraph or two in the "Notes and Queries" column, the information would be on record and available to everyone.

The want of such a means of recording facts impressed itself on me at the April meeting of the Club, during the discussion following Mr. Hardy's paper on the mole cricket and wasp, when a number of unrecorded observations were voiced by members, and this is only one instance of many that could be mentioned. By way of a start for the "Query" column, I would like to ask :—

(1) How are pools that generally dry up during summer re-stocked with the fish known to boys as "silver-fish" (a species of carp, I believe) ? Can the ova resist drought ? I don't think the theory that the ova are brought to the pools by water-fowl will hold good, as fish are found in ponds that are too small to tempt water-fowl to visit them, and the newly-hatched fish may be found in the ponds a very short time after water has again accumulated in them.

(2) Why some orchids, such as *Lyperanthus nigricans*, are found abundantly in places where scrub has been burnt off, and where they were only occasionally met with previous to the burning-off ?

Trusting the suggestion will meet with your approval, I am, Yours, &c.,

POND HUNTER.

[The suggestion of "Pond Hunter" is a good one. Queries and observations are invited from other contributors which will be dealt with as fully as possible.—Ed. *Vict. Nat.*]

"Photography for Bird-Lovers."—This is the title of an eminently useful book of 125 pages, forwarded to us by the publishers, Witherby and Co., Holborn, London. In it the author, Mr. Bentley Beetham, F.Z.S., deals in a practical manner with bird photography in its various branches. Separate chapters are devoted to Apparatus, Nest Photography, Photographing Young Birds, Birds in Flight, Photographing in Colour, and in Cinematography, &c. In connection with photographing birds in captivity, he says :—"The great value of pictures of specimens in confinement lies in the accurate representation of the bird as a creature, of its markings, and its form. . . . We want a large, bold picture of a bird for reference, one giving at a glance the general appearance of its species, and on a more careful examination the most minute detail of its plumage." He remarks that all such photographs should be distinctly marked as from captive birds, for not only have such photographs been passed off as studies of wild-life, but what is a thousand times worse pictures of stuffed birds have been made to serve the same purpose, and in the interests of the hobby of bird photography all such impositions should be exposed. The volume is splendidly illustrated with sixteen full-page plates, examples of work done by the methods recommended. The work is published at five shillings, and should be of great value to the photographer of nature subjects, even if not birds.

Botanical Photography.—Mr. P. F. Visick, of the Catford and Forest Hill Photographic Society, in the *Selborne Magazine* for March, 1911, contributes an article on the photography of Botanical Objects, a branch of photographic work in which we are somewhat deficient in workers in this State. He says that almost any camera will do, if one purchases certain extra appliances which are necessary, but as an all-round instrument well suited for the purpose he recommends the "Klimax," by W. Butcher and Sons, London. Unless otherwise ordered, the cameras are fitted with an "Aldis" anastigmat working at F 77. The shutter is a Lukos Sector, for time, bulb, and automatic exposures from 1 second to a hundredth part. The cameras are made in the usual various sizes, with single or double extension, the latter being preferable. An excellent handbook explaining the working of the cameras can be obtained from the makers. A brass telescopic tripod, which can be used at any distance, say from one to four feet, from the ground, is indispensable. He then goes on to give hints as to securing the pictures. Choose a day with little or no wind, and get your object focussed to the requisite size with the lens at full aperture. It is then stopped down until the rear proportions are in focus. Unless your plant is totally different to its neighbours, it is well to remove some of these, if possible, so as to prevent confusion on the finished photograph. In all cases use the backed ortho-chromatic plates by standard makers. These give approximately proportional colour values to visual observation. Whether the whole or a portion of a plant is photographed use a paper or cardboard measure, either in inches or centimetres for purpose of conveying an idea of the size of the plant or flower. Further details are given as to methods for good results, such as cardboard backgrounds, also printing and developing. There is an opportunity for some member of the Field Naturalists' Club to do good work in this direction, as illustrations of our Victorian flora are badly wanted, and a handy botany of the State cannot be long postponed. The success of the method of illustrating Mr. Leach's bird book should be of help with regard to the plants. The "Plants of New Zealand," issued some time ago, was a good instance of the value of illustrations of flowers from photographs, but the latest development may be seen in the recently published "Wild Flowers as they Grow" (Cassell and Co.), in which twenty-five plates are given of English wild flowers, photographed in colour direct from nature, by Mr. H. E. Corke, F.R.P.S., and charming pictures they make, the dog-rose, foxglove, harebell, and musk-mallow being particularly good. The descriptive text by Mr. G. C. Nutall, B.Sc., is very pleasantly written, and greatly adds to the interest of the work.

The Victorian Naturalist.

Vol. XXVIII.—No. 5. SEPTEMBER 7, 1911. No. 333.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th August, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 55 members and visitors were present.

REPORTS.

A report of the excursion to Warrandyte on Saturday, 12th August, was given by the leader, Mr. G. Coghill, who said that the outing had been arranged for the purpose of seeing the Silver Wattles, *Acacia dealbata*, which grow along the river near that township, in full bloom, and, though the day was somewhat unpropitious, the party had a very enjoyable trip, and caught the wattles in their prime.

A report of the visit by the juniors to the National Museum on Saturday, 5th August, was given by the juniors' secretary, Mr. C. Stout, who acted as leader in the absence through illness of Mr. J. A. Kershaw, F.E.S., Curator of Zoology, who had intended to point out the distinguishing features of the larger mammals. He said that attention had been given to the various forms of feet possessed by animals, and an instructive afternoon had resulted.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. James, Continuation School, Melbourne, Mr. J. R. Murdock, 142 Park-street, Parkville, and Mr. F. Watson, 482 Madeline-street, Carlton, were duly elected as members; and Mr. A. J. Gill, State School, Cockatoo Creek, and Mr. F. P. Dodd, Kuranda, North Queensland, as country members of the Club.

GENERAL BUSINESS.

Mr. J. R. Tovey called the attention of the meeting to the great destruction of native vegetation which is taking place in Cheltenham Park in order to form golf links, and urged that a protest be made to the authorities against the clearing away of so much of the indigenous vegetation. Mr. J. Shephard supported the remarks, and said that the Cheltenham Park had been for many years an ideal collecting ground for all branches of natural history. Mr. F. Pitcher said that he understood it was intended to plant a number of eucalypts and other trees in the park. On the motion of Messrs. Pitcher and Coghill, the matter was referred to the committee, with power to act.

Dr. T. S. Hall, M.A., said that some four years ago the Rail-

way Department had, at the instance of the Club, agreed to leave certain portions of the railway cuttings (*Vict. Nat.*, vol. xxiv., p. 158) near Melbourne, where interesting geological features occurred, in their natural state, but recently he had noticed that three of these places were being improved by the planting of creeping and other plants. He thought that another effort should be made to have boards erected indicating the particular features of each place, and moved that the Railway Commissioners be asked to receive a deputation with regard to the matter. This was seconded by Mr. G. A. Keartland, with the addition that the committee communicate with kindred societies, and arrange a strong deputation.

PAPERS READ.

1. By Mr. J. A. Kershaw, F.E.S., entitled "Additions to the Fish Fauna of Victoria, No. III."

The author recorded the occurrence in Victorian waters of the Long-finned Boar Fish, *Zanclistius elevatus*, Rams. and Ogil., the Pilot Fish, *Naucrates ductor*, L., and one of the coral fishes, *Chætodon sexfasciatus*, Rich., and gave some description of each species, and exhibited specimens of them.

2. By Mr. C. J. Gabriel, entitled "Notes on Some Exotic Mollusca Found at Coode Island."

The author stated that, attracted by the remark in Mr. Tovey's recent paper on the flora, that he considered a conchologist would probably do well there, he had visited the island, and examined some of the ballast heaps, with the result that he had collected about one hundred and twenty species of shells, ninety of which were in sufficiently good condition to be identified as having come from South Africa or the Pacific Coast of North America. He considered this fact of sufficient importance to be worth recording, in order to save confusion at some future time.

Mr. A. H. E. Mattingley, C.M.Z.S., suggested that some action should be taken to prevent ships' ballast being deposited on the island, but it was generally thought that some definite place for its deposition was better than allowing shipmasters to lighten their vessels anywhere, and so cause further confusion of species.

3. By Mr. F. P. Dodd (communicated by Mr. J. A. Kershaw, F.E.S.), entitled "A Collecting Trip to the Herberton District, North Queensland."

The paper was read by Mr. Kershaw, and, though dealing principally with insect life, incidentally mentioned a variety of subjects, and particularly drew attention to the tendency of collectors to exaggerate their experiences. He alluded to the remarkable appearance of the large day-flying moth, *Nyctalemon orontes*, in countless numbers. Its flights did not

seem to be lessened by a phenomenal rainfall experienced, probably because the moths had come from beyond the path of the storm. Birds were not very numerous, but he had been able to make several interesting observations with regard to the Tooth-billed Bower-bird.

Mr. R. W. Armitage, B.Sc., congratulated the author on his interesting paper, which he hoped would be followed by others of a similar character.

Mr. F. G. A. Barnard said that the terms "forest" and "scrub," as used in North Queensland, have totally opposite meanings to that given them in Victoria, scrub there indicating the densest country, containing the largest trees.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland said that he had recently seen in a friend's aviary a hybrid finch which exhibited all the characteristic markings of both the Spotted-sided Finch and the Chestnut-eared Finch, though not in the usual colouration.

Mr. J. A. Kershaw, F.E.S., said that a specimen of the Tupong, or so-called Freshwater Flathead, had recently been taken in the River Murray, near Mildura. This seemed to be its most westerly occurrence for Victoria, as Werribee and Lancefield had hitherto been its limits in that direction.

The chairman drew attention to the leaflet issued by the Wattle Day League, explaining its objects, and circulated, at the League's request, in the current *Naturalist*.

EXHIBITS.

By Miss Davis. — Fine specimens of the limpet, *Patella limbata*, also sea-horse, *Hippocampus*, sp., from Eaglehawk Neck, Tasmania.

By Miss Douglas.—Fossilized wood from Tasmania.

By Messrs. C. French, jun., and J. E. Dixon.—Specimen of the remarkable fungus, *Battaria phalloides*, found on sand hummocks at North Brighton on 6th August. This fungus is rare and has only been recorded from North West Victoria, South Australia, and Western Australia.

By Mr. C. J. Gabriel.—One hundred and twenty-one species of exotic mollusca found at Coode Island, in illustration of paper: also specimens in better condition, for comparison.

By Mr. J. A. Kershaw, F.E.S., National Museum.—Mounted specimens of fish new for Victoria—viz., Long-finned Boar Fish, *Zanclistius elevatus*, Rams. and Ogil., Pilot Fish, *Naucrates ductor*, L., and Coral Fish, *Chætodon sexfasciatus*, Rich., in illustration of paper.

By Mr. A. H. E. Mattingley, C.M.Z.S.—Egg of Australian Gannet, or Booby, *Sula serrator*, from Lawrence Rock, near Portland, Victoria.

By Mr. F. Pitcher, for Curator of Botanic Gardens, Mel-

bourne.—Flowers of six species of early flowering acacias—viz., *A. alata*, R. Br., Western Australia; *A. cardiophylla*, A. Cunn., New South Wales; *A. elongata*, Sieber, Victoria, New South Wales, and Queensland; *A. Jonesii*, F. v. M. and Maiden, New South Wales; *A. leprosa*, Sieber, Victoria and New South Wales; and *A. spectabilis*, A. Cunn., New South Wales and Queensland.

By Mr. J. Stickland.—Old leaves covered with pine pollen, carried by wind and deposited in garden at Hawthorn (under microscope).

By Mr. J. R. Tovey.—A seedling plant of Blue Gum, *Eucalyptus globulus*, Lab., found growing in a small crack, about half an inch wide, between the asphalted footpath and the foundation of a building in Park-street, South Yarra. The only blue-gum tree growing near the spot is fully forty yards away, on lower ground, consequently the seed was probably transported by wind, or the agency of birds.

After the usual conversazione the meeting terminated.

Note.—In last month's "Proceedings" the word "Eocene," in line 9, p. 67, was misreported, and should read "Miocene."

A Handy Victorian Guide.—A useful, well illustrated booklet of 260 pages (oblong), under the title of "The Country Hotel and Boarding-house Guide and Tourists' Handbook," has recently been published by Lake and Sons, Melbourne. It contains full information as to the principal hotels and boarding-houses, and the cost of living at the various tourist resorts of the State. Copies can be obtained free on application at the Victorian Government Tourist Bureau, Collins-street.

"A Brief Review of the Fisheries of New South Wales."—The presidential address to the New South Wales Naturalists' Club of Mr. D. G. Stead, who is naturalist to the Board of Fisheries of New South Wales, has been issued as a useful booklet of 30 pages, with 17 plates, by the Department of Fisheries of that State. The author deals with fishes, crustaceans (giving useful notes about crayfish, crabs, and prawns), molluscs (the oyster harvest amounts to 20,000,000 annually, a great part of which is due to artificial cultivation), cetaceans (dolphin-fishing is carried on for the sake of the teeth, which are sold to firms trading with the Solomon and other Pacific islands to be used as currency), sponges, and sea-weeds. Regarding the two last groups, the author considers that, following the lines of other countries, great advance must shortly take place in their economic development. The seventeen plates contain about double that number of figures, and are exceedingly good.

EXCURSION TO WARRANDYTE.

THE excursion to Warrandyte on Saturday, 12th August, was arranged mainly to see the Silver Wattles, *Acacia dealbata*, in full bloom, and the outing, like that of two years ago, took the form of a motor drive, two large motor coaches being filled with a party of forty-two members and friends. Owing to the threatening state of the weather it was decided to go *via* Heidelberg and Templestowe instead of Box Hill and Ringwood, as had been intended. Wattle time and showery weather are often concurrent, and this year was no exception. Rain had fallen in the morning, and again during the drive, consequently the roads were slippery, and the drivers had to proceed somewhat slowly, and exercise considerable care to prevent their vehicles skidding. On account of the rain the distant views (for which the road is so famous) were quite lost, and, from the lack of sunshine, the gold of the wattles was not brought out in that glorious contrast with the foliage of the trees which makes them such objects of beauty in the flowering season. However, the wattles were at their very best—no trees half or nearly over; those that were not in full bloom were just ready to burst into all their glory. Our first glimpse of the golden blossoms was secured as we crossed the Yarra at Heidelberg, and here and there through Templestowe further glimpses were obtained. An occasional tree of the Golden Wattle, *Acacia pycnantha*, laden with its large golden balls of flowers, was seen as we passed through the park-like country about Templestowe. At the Mullum Mullum or Deep Creek the Silver Wattles again made a fine show. Further on a smaller acacia, *A. diffusa*, with rigid, thorny leaves (or phyllodes), brightened the countryside with its yellow flowers. *A. acinacea* was also seen in considerable quantity, but few of its flowers were showing colour. The heliotrope flowers of the climbing *Hovea heterophylla* were conspicuous among the shrubs on the roadside. The view of Warrandyte from the old road over Melbourne Hill at this time of year, with the river outlined in yellow, is charming in the extreme, but unfortunately the new road, cut round the hillside at an easier grade, avoids that vantage point, consequently visitors would do well to seek out this spot for themselves. We proceeded through the township to about a quarter of a mile beyond the bridge, where there were some splendid trees in full bloom. Having feasted our eyes sufficiently on the glorious scene, we returned to the Grand Hotel, and, on the spacious balcony overlooking the river, did ample justice to the good things provided by the president and others. It was almost dark before we were ready to start for home, which was reached *via* East Doncaster, Blackburn, and Kew. The outing was a delightful one, and had the day been brighter would have been all the more enjoyable.—G. COGHILL.

THE ALTERATION OF THE QUAIL SEASON, AND ITS EFFECT.

By G. A. KEARTLAND.

(*Read before the Field Naturalists' Club of Victoria, 10th July*, 1911.)

ALMOST from the inception of the *Game Act*, fifty years ago, there has been agitation regarding the time for opening the shooting season. At first it was argued that quail should be protected during the same period as ducks—from 1st August to 20th December; but I believe one season was enough to satisfy all parties interested that an extension of the close season was necessary, as shooting started soon after the first broods of young ones were hatched.

During the years that have intervened since that period the administration of the Act has not only changed hands with each change of Ministry, but it has passed from one Government department to another; but with each change the agitation for an alteration of the close season for quail has invariably cropped up. It has been altered from 1st February to 1st March, then to 1st April, then to different dates on each side of the Dividing Range, then back to 1st March; but this year the 14th February was the date fixed upon for commencing shooting.

It is nearly twenty years since I first brought the matter of the protection of quail under the notice of this Club, advocating an extension of the close season until 1st April In doing so I was actuated by two motives—a wish to increase the number of birds by allowing the old ones to finish breeding and giving the young ones time to mature. It also delayed shooting until the weather was cooler, and enabled the sportsman to arrive home with his game in good condition. A further reason is that the best dogs will often pass birds in the hot days of February and March which they would be certain to find in cooler weather. An alteration was tried, but there is a class of quail shooters who delight to boast of the number of brace they kill in a season. They like to get to work early, and, as the quail with young ones lies close and flies slowly when flushed, it is easily bagged, whilst the full-grown young ones and those free from parental cares are more alert, and dash away when disturbed, often flying out of sight before they alight again. When on deputations to the Government on this subject the statement is often made that no sportsman will shoot a "squeaker"—that is, a young bird not fully grown, which always utters a squeaking note when flushed. Well, if such be the case, I can only say that the majority of quail-shooters are not sportsmen.

This season (1911) it was notified a few days before that the

opening day would be the 14th February. I visited several paddocks on the previous Saturday to try and locate a few birds, but nearly every adult quail found was accompanied by a brood of little ones. I then received an invitation to a farm, where, I was assured, there were some good birds. I went there on the opening day, and found some three-parts-grown chickens, probably a month old, scattered about the stubble, but nearly every adult bird had its brood of little ones or was sitting on eggs. I saw about a dozen broods with only wing feathers, all the rest of the body and head being covered with down. When flushed they all went in one direction—towards the top of the hill. Passing on to a grass flat some distance off, I shot a few brace of birds, which went off wildly when disturbed, showing by their mode of flight that they had nothing to detain them. On my return in the evening I was disgusted to see four shooters, with their dogs, beating just where the young ones had gone in the morning. They must have fired over one hundred cartridges in a very short time, six or seven shots being fired as fast as they could load. One of the sportsmen could not find his bird, and, as I was going to pass near where it fell, I set my dog to work, and she soon pointed the victim. It proved to be a chicken, not larger than the end of my thumb, and was lying in a hole made by a cow's hoof. As its leg and wing were broken, I killed it. On showing it to some shooters they assured me "There were plenty like that shot to-day. They all count." They explained that the craze for big scores was responsible for their conduct. All the adult hen birds I shot were full of eggs.

On 18th February I went with a friend to another farm, where I found three clutches of eggs, from which the birds had been shot earlier in the morning. There were eleven, nine, and seven eggs respectively in the nests. In another paddock my dog "pointed" at a tussock, which I kicked, thinking it concealed a rabbit. As the dog would not leave the spot, I laid down my gun and parted the grass, and soon captured a female quail, uninjured. My friend took it home alive, and placed it in an aviary by itself. Next morning he found that it had laid an egg. I have not been out since, as the few old birds have been shot, and there are no young ones coming on.

The best proof of the absurdity of the last alteration of the opening day of the season is to be gained by a perusal of the Fish Market reports in the daily press. During May, quail realized up to 2s. per brace by auction. What the consumers had to pay my hearers may be able to guess. On inquiry at our leading game-sellers' shop I was informed that "quail are very scarce—in fact, there are none coming into the market." Is it any wonder that quail are scarce when they have only been

allowed to rear one brood instead of three or four, which they would do if permitted? As the Stubble Quail, *Coturnix pectoralis*, usually lays about forty eggs in a season—*i.e.*, between September and April—the scarcity of birds is easily accounted for. This is emphasized by the fact that all the indications pointed to a good season.

If some means could be devised for limiting the number of cartridges to be used or shaming quail-shooters into moderation in the extent of their bag, something good might result. At present our principal quail-shooters are simply slaughterers, gloating over the number they can kill; but a sportsman derives his pleasure from seeing his dogs work and testing his skill on strong, fast birds, which, being fully grown and in prime condition, are worth taking home at the close of a pleasant day with dog and gun. My experience this season is corroborated by the press reports from Ballarat and many other districts.

[Since reading my paper the following telegram appeared in the *Age* of 19th July, thus proving that all quail do not migrate and leave the State before the 1st of April:—

"THE QUAIL SEASON.—Good bags at Berrybank. Ballarat, Monday.—Quail are numerous in the neighborhood of Berrybank. They abound in particular in a 400-acre paddock belonging to Mr. J. Dixon, where on Saturday two sportsmen obtained 110 brace. It is Mr. Dixon's intention to reserve this paddock for special occasions."

It is also reported that young birds were found at Ballarat on the opening day, but where they were not disturbed they matured, and furnished good sport later on.—G. A. K.]

THE TUPONG.—In the "Records of the Australian Museum," vi. (1905), p. 38, Mr. E. R. Waite recorded a specimen of the Tupong, *Pseudaphritis bassii*, Cuv. and Val., from the Murray River, near its junction with the Darling, this being, he stated, a new record for Western New South Wales. Recently an example was captured in the Murray at Mildura, a few miles up stream from the locality of Mr. Waite's specimen, and forwarded to the National Museum for identification. The specimen is the first I have seen from the northern parts of this State, though it is common in many of our southern streams, ranging as far east as the Gippsland Lakes. In a note published in the *Naturalist* for June, 1899 (vol. xvi., p. 31), Dr. T. S. Hall, M.A., drew attention to a specimen then living in the saltwater tanks at the Melbourne Aquarium.—J. A. KERSHAW.

ADDITIONS TO THE FISH FAUNA OF VICTORIA.

No. III.

By J. A. KERSHAW, F.E.S., Curator Zoological Department, National Museum, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 14th Aug.*, 1911.)

THE following species in the collection of the National Museum, although already known from other parts of the Australian coast, have not previously been recorded from Victorian waters :—

Family HISTIOPTERIDÆ.

ZANCLISTIUS ELEVATUS, Ramsay and Ogilby.

Histiopterus elevatus, Rams. and Ogil., Proc. Linn. Soc. N.S.W. (2), iii., 1888, p. 1,311 ; Waite, Mem. Aust. Mus., iv. (1899), p. 114, pl. xxvi.

Zanclistius elevatus, Jordon, Proc. U.S. Nat. Mus., xxxii. (1907), p. 236 ; Waite, Rec. Canterb. Mus., i. (1911), p. 216.

LONG-FINNED BOAR FISH.

D. VI.26, A. III.15, V. I.5, P. 16, C. 17. L. lat. 70, L. tr. $\frac{15}{14}$.

Length of head, 3 ; height of body, 1.3 in length (without caudal) ; length of snout, 2.1 ; interorbital space, 3.2 ; diameter of eye, 3.1 in length of head. The third dorsal ray is the longest, being $1\frac{1}{3}$ in the length of the head and body, and slightly less than the height of the body. The first anal spine is short, rather less than the first dorsal ; the second is the longest, about equal to the third dorsal spine, and three times the length of the head. The pectorals equal the length of the head. The ventral spine is broad, flattened, and curved, with longitudinal striæ. The third, fourth, and fifth rays equal, and as long as the head.

In colour the specimen agrees with the description given by Waite, but all the fin rays are more or less pale yellow, the ventral spine and membrane blackish, and the caudal shows three indistinct transverse dark bands. The large oval black blotch on the dorsal extends from the thirteenth to the eighteenth rays, and is margined with creamy white, this colour continuing along several of the rays in two broken lines. The cheeks, opercula, and base of pectoral silvery ; eye yellow, blotched above and below with black.

A single example of this fish was taken off Queenscliff in May last and forwarded, among others, to the Melbourne Fish Market. It is in good condition, and measures eleven inches in length. A second, though somewhat damaged, specimen was found among an old collection of stuffed fishes in the Museum. Unfortunately, no particulars are known concerning it, though, as all the species in this collection occur in

Victoria, there is good reason to assume it was taken in Victorian waters.

The species was founded on an imperfect specimen $11\frac{1}{4}$ inches long, obtained in the Sydney Fish Market, and taken by the trawl net in 70 fathoms of water off Port Jackson. A good series was subsequently obtained by the *Thetis* trawling expedition off the New South Wales coast, from which the species was re-described, and an excellent figure given by Mr. E. R. Waite,* then Zoologist of the Australian Museum, Sydney.

In his "Edible Fishes of New South Wales" (1908), Stead also figures a specimen of this fish under the vernacular name of the Short Boar Fish. Still more recently Waite † has been able to extend the range of the species to New Zealand waters, a single example being taken in the Bay of Plenty during the New Zealand Government trawling expedition in 1907.

Family CARANOIDÆ.

NAUCRATES DUCTOR, Linn.

PILOT FISH.

Linn., Syst. Nat. (10th ed.), 1758, p. 295.
Day, Fish. India, p. 229 (1878–88), pl. li. (*a*). fig. 2.

This well-known and widely distributed fish has apparently not been previously recorded from the Victorian coast, though from its peculiar habit of accompanying large sharks, and even ships, it is probably a fairly frequent visitor.

It is distributed throughout the temperate and tropical regions, and has been recorded from several parts of Australia, as well as Tasmania.

The usual length is from nine to twelve inches, and it is said to attain a length of two feet.

In 1901 a large specimen of the Leathery Turtle, *Sphargis coriacea*, entered Corio Bay, at Geelong, and was accompanied by numbers of Pilot Fish. The turtle was captured by some local fishermen, together with over a dozen of the fish, and afterwards exhibited in that city, where I had an opportunity of examining them. Again, in May, 1902, the large Basking Shark, *Cetorhinus maximus*, which was captured in Hobson's Bay, and is now in the Museum collection, was noticed to be accompanied by a number of these interesting fishes. In March of last year a specimen, measuring nine inches in length, was caught by an angler at Frankston, and forwarded to the Museum for identification, and a few days later another was captured at the same spot.

When fresh the fish was of a beautiful dark blue colour, paler below, the lower half of the body tinged with golden.

* Mem. Aust. Mus., iv. (1899), p. 114, pl. xxvi.
† Rec. Canterb. Mus., i., No. 3 (1911), p. 216.

Top of head and snout, including the region of the eye, nearly black, with bluish reflections. A short, dark streak along the edge of the pre-operculum. Body with five well-defined, dark, transverse bands, extending on to the fins. Base of caudal and lobes blackish, the latter tipped with white, as is also the most anterior and posterior rays of the dorsal, anal, and ventral fins. Pectoral whitish at base, with black tip, corresponding to the body bands, while on the under side, the upper half, embracing the whole length of the longest rays, is black, and the lower half white.

Family CHÆTODONTIDÆ.

CHÆTODON SEXFASCIATUS, Rich.

Richardson, Ann. Mag. Nat. Hist., x. (1842), p. 26.
Günther, Cat. Fish., ii., p. 35 (1860).

Three specimens of this fish have been received from Victorian waters—namely, from Mordialloc (Port Phillip Bay), Western Port Bay, and Split Point. The latter was forwarded by Mr. G. T. W. Stevens, then lightkeeper at Split Point lighthouse, from whom I had previously received a sketch of another specimen taken at the same place.

The original specimen described by Richardson was collected by Gould in Western Australia. The species is also recorded from New South Wales.

DISTRIBUTION OF TROUT.—During the winter over 33,000 yearling trout have been distributed by the Agricultural Department, under the superintendence of Major Semmens, Chief Inspector of Fisheries, in various Victorian streams and reservoirs. Many places were far distant from the hatcheries, and it speaks well for the skill of all concerned that only 89 deaths occurred.

"PHYSIOGRAPHY OF EASTERN AUSTRALIA."—This publication forms Bulletin No. 8 of the Commonwealth Bureau of Meteorology, Melbourne, and is from the pen of Griffith Taylor, B.Sc., F.G.S., Physiographer to the Bureau. It consists of 18 folio pages, with 28 figures, many of which are whole-page maps. The author traces the changes which have taken place in the mountains and rivers of eastern Australia since Cretaceous times, and considers the effect of these changes on the positions of the railway systems of the different States, and the relations between contour and rainfall, &c. A previous Bulletin (No. 6) by the same author deals with the physiography of the proposed federal capital at Canberra, and, being well illustrated with maps and diagrams, enables the reader to easily grasp the salient features of the district, which has an elevation of about 2,000 feet above sea-level.

NOTES ON EXOTIC MOLLUSCA FOUND AT COODE ISLAND, WITH LISTS OF SPECIES.

By C. J. Gabriel.

(*Read before the Field Naturalists' Club of Victoria, 14th August,* 1911.)

In May last a most interesting paper was read before this Club by Mr. J. R. Tovey, of the National Herbarium, Melbourne, entitled "Notes on Coode Island and its Flora" (*Vict. Nat.*, xxviii., p. 56), in which he gave a general description of the locality, dealing with the early history of the site and the formation of the island in September, 1886. This description is so accurate that there is no need for me to add any further particulars.

While commenting on the occurrence of so many foreign plants, Mr. Tovey stated that ships' ballast had been deposited there, and might be responsible for the introduction of these aliens, adding that a visit to Coode Island would probably repay the conchologist. His remark recalled to my mind the fact that, in 1900, a vessel from Durban, South Africa, deposited some ballast shells on our shores—first at Geelong, again coming up the bay, and finally on the roadway adjacent to the Alfred Graving Dock, Williamstown. This action has caused, and may continue to cause, trouble in the matter of these shells being regarded as belonging to our local fauna. Hence, I considered the statement significant, and of sufficient importance to warrant a careful examination of the locality.

In company with a fellow-member the spot was duly visited, but the only "ballast" noticed contained representatives of our Victorian shells, which I have recorded in the July *Naturalist* (vol. xxviii., p. 50). These shells were probably contained in material carted there from the neighbourhood of St. Kilda or South Melbourne when filling in the island. On communicating this fact to Mr. Tovey, he suggested that possibly we had hunted the wrong ground—a contention which eventually proved correct, as, when a second visit was made along with him, a collection of some sixty species of foreign mollusca was obtained.

The spot in question is situated about two hundred yards from the south-west corner of the island, and nearly opposite Cuming, Smith's chemical works; but Mr. Tovey found the surroundings entirely changed since his last visit, a few months before, inasmuch as the ballast heaps observed on that occasion had been spread, and were now overgrown with the introduced South African Spinach, *Tetragona procumbens*. Still another trip was made, when the number of foreign species was augmented to 121. Here and there patches of ballast remained uncovered—these were thoroughly searched, and yielded an interesting collection of two distinct faunas. The quaint little *Nassa kraussiana*, Dunker, found in numbers, and *Patella*

rustica, Linn., suggested South African material, while North America was denoted by the finding of the large *Nassa fossata*, Gould, and *Crucibulum spinosum*, Sow., which appeared in great quantity. Possibly with further search more species could be obtained.

Since two faunas widely separated are represented at this locality, it is, I think, of paramount importance that a list be made and recorded. Of the total, 90 species have been identified, the remaining being in too indifferent a condition for certain identification. However, where possible the genus is given. It is interesting to observe that the South African representatives on this occasion are in many instances identical with specimens obtained in the Durban ballast of 1900, a dray-load of which was carefully worked over by our fellow-member, Mr. J. H. Gatliff.

The identification of material such as this, and especially when in bad condition, is no easy task, and I have to acknowledge great assistance from Mr. Gatliff's labours. The North American species were identified by comparison with specimens received from a Californian correspondent. With this evidence I venture to suggest that these are the localities for our Coode Island foreigners.

My note is somewhat brief, its object being merely to place on record the existence of these exotic shells on the island. As a Club we have to thank Mr. Tovey for bringing this matter under our notice, and I think some satisfaction is gained in the fact that by so doing we bequeath a help to subsequent workers, in whatever branch of natural history they may be concerned.

The following is the list of mollusca found :—

North America.

Gastropoda.

Nassa fossata, Gould.
,, perpinguis, Hinds.
Phasianella compta, Gould.
Scala hindsi, Carp.
Columbella gausapata, Carp.
Conus californicus, Hinds.
Olivella biplicata, Sby.
,, semistriata, Gray.
Littorina littorea, Linn.
Calliostoma gemmulatum, Carp.
Omphalius fuscescens, Phil.
Crucibulum spinosum, Sby.
Crepidula fornicata, Linn.
,, adunca, Sby.
,, dorsata, Born.
Natica triseriata, Say.
Nacella incessa, Hinds.
Dentalium hexagonum, Sby.

Lamellibranchiata.

Ostrea lurida, Carp.
Chlamys æquisulcatus, Carp.
,, monotimeris, Conrad.
Mytilus californianus, Conrad.
Cardium mortoni, Conrad.
,, edule, Linn.
Chione simillima, Sby.
Glycimeris septentrionalis, Midd.
Arca transversa, Say.
Donax culter, Hanley.
Siliqua bidentata, Spengler.

South Africa.

Gastropoda.

Nassa kraussiana, Dunker.
,, producta, Sby.
Sistrum undatum, Chem.
Purpura squamosa, Lam.
Cominella lagenaria, Desh.
,, puncturata, Sby.
Melongena paradisiaca, Mart.
Marginella dunkeri, Krauss.
Conus tessellatus, Born.
Columbella turturina, Lam.
Mitra capensis, Dunker.
Buccinanops digitale, Meusch.
,, tenui, Gray.
,, diluta, Krauss.
Turritella carinifera, Lam.
Pyramidella terebellum, Lam.
Cerithium morus, Lam.
Calliostoma farquhari, Sby.
Priotrochus obscurus, Wood.
Rissoa nigra, Wood.
Rissoina crassa, Ang.
Phasianella kochii, Phil.
Natica imperforata, Sby.
,, mamilla, Lam.
,, marochiensis, Gmel.
,, queketti, Sby.
,, clavata, Sby.
Calyptræa chinensis, Linn.
Fissurella incarnata, Krauss.
Glyphis crucifera, Pilsbry.
Patella rustica, Linn.
,, granularis, Linn.
Siphonaria concinna, Sby.
,, aspera, Krauss.
,, albo-fasciata, Krauss.
Cyclostoma lineatus, Pfeiffer.

Lamellibranchiata.

Chlamys fultoni, Sby.
,, pusio, Linn.
Pecten sulcicostatus, Sby.
Sunetta ovalis, Sby.
Dosinia lincta, Pulteney.
Chione verrucosa, Linn.
,, arakenensis, Nevill.
Meretrix manillæ, Sby.
,, sowerbyi, Rve.
Tapes kochii, Phil.
,, quadriradiata, Desh.
Circe divaricata, Chem.
Felania subradiata, Sby.
Diplodonta rotundata, Mont.
Tellina dubia, Desh.
,, crawfordi, Sby.
Donax faba, Chem.
,, sordidus, Rve.
,, elongatus, Lam.
,, simplex, Sby.
Mactra adansoni, Phil.
,, l'argillierti, Phil.
Arca obliquata, Sby.
,, lactea, Linn.
,, navicularis, Brug.

Unidentified Species, Locality Unknown—presumably South Africa or North America.

Gastropoda.

Nassa, sp. (?)
Ancilla, sp. (?) (three species).
Calliostoma, sp. (?)
Gibbula, sp. (?)
Minolia, sp. (?)
Crepidula, sp. (?)
Vermicularia, sp. (?)
Patella, sp. (?)
Tornatina, sp. (?)
Turbo, sp. (?) (operculum), (two species).
Genus (?) sp. (?)
Bothriembryon, sp. (?)

Lamellibranchiata.

Lucina, sp. (?) (five species).
Semele, sp. (?)
Tellina, sp. (?) (four species).
Psammobia, sp. (?)
Donax, sp. (?) (two species).
Arca, sp. (?)
Unio, sp. (?)
Genus (?), sp. (?)

CORRESPONDENCE.

THE LOWAN, OR MALLEE-HEN.

To the Editor of the Victorian Naturalist.

Sir,—In reading the extremely interesting lecture by Mr. J. A. Leach, M.Sc., on "The Birds of Victoria" in the December number of your journal, I was somewhat surprised to learn that the young Lowan chick never knows its parents. Although I have never seen the small, young chickens and the old Lowans in company, my many years' rambling in the haunts of these remarkable birds has quite satisfied me that the young chick does know its parents. In the first place, after the young chicks have made their escape from the nesting mound they do not wander far, as their fresh little footprints may be plainly seen around the nesting mound and in the vicinity for many weeks afterwards. Now, as the parent birds keep in the neighbourhood of their nesting mound throughout the nesting season, the young Lowans must necessarily often meet their parents. If Mr. Leach can explain to me how it is that the young Lowan cannot recognize or know its parents he will greatly enlighten me on the matter. According to my observations, when once the young chicks are out of the mound the old birds do not assist them to seek their daily food, as the young ones are quite capable of looking after themselves. I have known a young chick to pick up bread crumbs that were thrown upon the ground within two hours after I had taken it out of the nesting mound.—I am, yours, &c.,

C. M'LENNAN.

BOOK NOTICE.

Australia in its Physiographic and Economic Aspects. By Griffith Taylor, B.A., B.Sc., B.E., F.G.S. 263 pp. (7½ x 5), with 60 figures in the text. Oxford: The Clarendon Press. 1911. 3s. 6d.

The author, who was formerly Lecturer in Economic Geography in the University of Sydney, and is now Physiographer to the Commonwealth Meteorological Bureau (though at present acting as geologist to Captain Scott's Antarctic Expedition), has succeeded in producing a highly interesting account of Australia from a physiographic and economic point of view. The volume forms one of a series of Oxford geographies, edited by Dr. A. J. Herbertson. In his introduction the author rightly complains of the small space usually given to Australia in leading geographies and atlases as compared with countries which, as regards the British Empire, at any rate,

are of far less importance. Under physiographic aspects chapters are devoted to the exploration and exploitation, physical conditions, natural regions (vegetation, geology, &c.), with a special study of New South Wales. Under economic aspects the author deals with stock-raising, agriculture, mining, minor industries, and transport, finally giving a forecast of the future close settlement of our continent, regarding which his conclusions are that, as the suitability of the continent for settlement depends upon rainfall and position, 24½ per cent. must be considered as useless, to which 19½ per cent., with a rainfall of less than 10 inches, must be added if the risks of bad seasons are to be allowed for, making a total of 44 per cent. which he classes as arid; 17½ per cent. (ten times the area of Java) is suitable for tropical agriculture: while 39½ per cent. is suitable for profitable white settlement Of this latter, 28 per cent. is good pastoral country, and 11 per cent. (three times the area of Great Britain) good temperate farming country. The writer's comments are well illustrated throughout by maps and diagrams, and we trust the volume will show other geographers the importance of Australia as a contributor to the world's needs, even though, compared with its size, it is thinly populated. It should also help to clear up many of the inaccuracies regarding Australia which continually crop up in contemporary literature. Though the writer has traversed a large portion of the continent himself, naturally the writings of many other authors are quoted, but to each due reference is given.

Sanctuaries for Game.—Nearly thirty Crown reserves, amounting to 234 square miles, and twenty-three private estates, covering about 25 square miles, have been proclaimed as sanctuaries for native game in Victoria. These are situated in all parts of the State, and, if the regulations are respected, should in a few years become real homes for our feathered friends.

Flying Foxes.—"Near some of the creeks the clusters met with must have represented tens of thousands of this combination of bird and animal; and as they measured some four or five feet from wing-tip to wing-tip, you can understand what sort of commotion they produced, and the shadow they cast." From "By Flood and Field," a new volume by Mr. Alfred Searcy, of Adelaide, author of "In Australian Tropics," which was so favourably received some months ago. From its pages many interesting particulars about the natural history of the Northern Territory may be gleaned, as well as information regarding the aboriginal inhabitants of that part of Australia.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th September, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the excursion to Bayswater on Saturday, 26th August, was forwarded by the leader, Mr. C. F. Cole, who reported an attendance of about fifteen members. The afternoon was devoted to ornithology, and several interesting species were met with, such as a flock of Flame-breasted Robins, among which there were several of the Scarlet-breasted species of both sexes; opportunity was therefore taken to point out the differences between the two species. A pair of Yellow-tailed Tits was noticed seeking for insects on the ground, and, on a search being made, a nest was found among the branches of a native cherry close by. A beautiful specimen of the Golden-breasted Whistler (formerly known as the White-throated Thickhead), *Pachycephala pectoralis*, was seen devouring the larvæ of some leaf-eating insect. A flock of the Red Wattle-bird (Wattled Honey-eater), *Acanthochæra carunculata*, was seen flying overhead. Altogether, some seventeen species of birds were noted during the short time available for the ramble.

A report of the excursion to Ringwood on Saturday, 9th September, was given by the leaders, Messrs. A. H. E. Mattingley, C.M.Z.S., and J. W. Audas. The former, dealing with the birds, said that, the locality being so close to that of the previous excursion, the ornithology was practically the same, no remarkable species being noted. Mr. J. W. Audas, dealing with the plants, stated that about forty species were met with in bloom. A north-westerly direction was taken from the station over the prevailing grey loamy soil of the district. The Native Heath, *Epacris impressa*, was everywhere, while a number of the smaller spring flowers carpeted the ground. A particularly fine specimen of the Kangaroo Acacia, *A. armata*, in full bloom, was a pretty sight, but too prickly to handle. The white variety of *Comesperma ericinum* was met with. A hillside studded with *Pultenæa stricta*, var. *Gunnii*, covered with its orange flowers, had a charming effect. In the shade of some eucalyptus saplings

a specimen of the orchid *Pterostylis longifolia* was gathered, with a stem measuring thirty-three inches. Near by five other orchids, *P. pedunculata*, *P. nutans*, *Diuris maculata*, *D. longifolia*, and *Caladenia carnea*, were found in bloom. Some fine specimens of *Exocarpus cupressiformis*, generally known as the Native Cherry, well laden with its so-called fruits, were seen. Six species of climbers were noted—viz., *Glycine clandestina*, *Billardiera scandens*, *Clematis aristata*, *Comesperma volubile*, *Thysanotus Patersoni*, and *Hardenbergia* (*Kennedya*) *monophylla*—the latter a glorious sight with its masses of purple flowers entwining the stems of the gum saplings. Of ferns, only three species were noted—the Maiden-hair, *Adiantum Æthiopicum*, the Screw Fern, *Lindsaya linearis*, and the bracken, *Pteris aquilina*. The afternoon's ramble was brought to a pleasant conclusion by partaking of "billy" tea, kindly provided by one of the ladies.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. R. E. Summers, Commonwealth Laboratory, Melbourne, was duly elected as a member; and Miss Annie Mommsen, Ivanhoe, Master Willie Brunet, St. Kilda, Master George Glannon, Middle Park, and Master Robert Oxley, Middle Park, as junior members of the Club.

GENERAL BUSINESS.

Mr. G. Coghill said that the subscriptions through the Club to the Sayce Fund had amounted to £53, which had been handed over for the benefit of the children.

Dr. Hall said that he still had Mr. Sayce's microscope and a large number of microscopical slides to dispose of. These could be seen at Mr. J. Searle's, 274 Collins-street.

PAPERS READ.

1. By Mr. A. G. Campbell, entitled "A Census of the Grampian Plants."

The author referred to previous records of Grampian plants, and said that, as the flora of the Grampians was so interesting and distinct, and as so many additions had been made since the publication by the late Mr. D. Sullivan of his census in 1890, he thought it would be of value to botanists to have the list brought up to date. Mr. Sullivan had recorded 550 species. His investigations had added 76 names to the list, which, with other records, brought the total up to 686, and it was possible a few other species might yet be added.

Prof. A. J. Ewart, D.Sc., said the Club was indebted to Mr. Campbell for his interesting paper, but he regretted the author had not treated the matter of plant associations more fully;

however, that could be dealt with later, when more data as to the prevalence of certain species was available.

Mr. G. Coghill drew attention to the singular beauty of the Grampian flora, and urged members to visit the mountains in spring, when they were decked with flowers unequalled in any other part of the State.

Mr. J. A. Leach, M.Sc., considered that the scenery and floral wealth of the Grampians were more attractive than those of the Buffalo Mountains, and said that the causes which produced such an attractive landscape had not yet been satisfactorily accounted for. He remarked that residents of the plains surrounding the mountains greatly exaggerated the difficulties of exploring their fastnesses, which, however, would not be thought much of by visitors used to hilly country.

Mr. F. G. A. Barnard said that the peculiar name, Mount Zero, given to the most northerly peak of the mountains, recorded the fact that when Major Mitchell spent a night on Mount William in July, 1836, the thermometer fell below freezing point, in consequence of which one of his party suffered severely from frost-bite.

2. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria, Part III."

The author dealt with the beetles belonging to the family Staphylinidæ, of which he recorded twenty-six species. The members of the group are generally of an unattractive character, and little is known of their life-histories. He gave, however, some account of the habitats of the different species.

Mr. F. G. A. Barnard congratulated the author on the useful work he is doing, and wished that similar observations for other portions of the State would be undertaken.

3. By Mr. Reginald Kelly, entitled "From Healesville to Mount Donna-Buang."

The author described a ride taken in midwinter along the range from the Badger River to Mount Donna-Buang (4,080 feet), when, owing to the amount of snow on the ground, only shrubs and trees could be noted with any degree of certainty. He remarked on the great resemblance between the young forms of *E. globulus* and *E. goniocalyx*, the latter being easily mistaken for the former—the common blue gum. From his observations he considered the district would provide ample work for investigation at a more propitious time of year. The author also gave some account of the origin and meaning of the name Donna-Buang, about which there is some uncertainty.

Mr. A. D. Hardy, F.L.S., remarked that in the Otway Forest *E. goniocalyx* was often sold as blue gum by the sawmillers, who maintained that it was an equally good timber.

NATURAL HISTORY NOTES.

Birds in the Mallee.—Mr. J. C. Goudie forwarded some interesting notes of unusual bird visitors to the Sea Lake district, North-Western Victoria. These consisted of the Black Cockatoo, the Kookaburra, the Black-cheeked Falcon, and the Silver Gull. With regard to the latter, it might be remarked that Sea Lake is over 200 miles from the nearest portion of the coast.

EXHIBITS.

By Mr. J. W. Audas.—Specimen of orchid *Pterostylis longifolia*, the "Tall Green-hood," with flower stem thirty-three inches long, found during Ringwood excursion, 9th September.

By Mr. C. J. Gabriel.—Marine shells, *Akera soluta*, Chem., from Mauritius, also a South Australian specimen; and *Halia priamus*, Meusch, from Spain.

By Mr. W. G. Mackintosh.—Three specimens of wood opal from Tasmania.

By Mr. J. R. Tovey.—Fruit of the Papaw-tree, *Carica papaya*, L., a native of tropical America. This tree is cultivated in Queensland and elsewhere for the sake of its fruit, which is edible, and has many useful properties.

After the usual conversazione the meeting terminated.

Conversazione and Exhibition of Wild Flowers, 26th and 27th September.—The full report will appear in the November *Naturalist*.

Microscopical Society of Victoria.—The third annual meeting was held on 24th September, when an encouraging report was presented. The new president is Mr. J. Shephard, with the Rev. W. Fielder and Mr. J. Searle as vice-presidents. Dr. J. C. Kaufmann was re-elected hon. secretary.

Large Blackfish.—An angler who takes a 2-lb. Blackfish, *Gadopsis marmoratus*, considers himself lucky; but on 30th August a party of anglers secured 50 lbs. weight of this fish from the Bunyip River. Among them were fish weighing 6 lbs. 3 ozs., 5½ lbs., 4½ lbs., and 4 lbs. The heaviest fish, measuring 24½ inches in length, 13½ in girth, and 5½ in depth, was forwarded to the Victorian Anglers' Club, to be stuffed and mounted as a trophy for the club rooms. It is gratifying to know that at Geelong an attempt is being made to rear Blackfish artificially, and thus re-stock our streams with one of the most toothsome of fishes, and one which takes no little art to catch, owing to its retiring habits.

A CENSUS OF GRAMPIAN PLANTS.

By A. G. CAMPBELL.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1911.)

It was in 1836 that the first botanical specimens were collected from the Victorian Grampians. Major (afterwards Sir Thomas) Mitchell, the soldier-explorer, in the overlanding journey that made him famous, ascended and named Mount William in the month of July of that year. It would be interesting to know the discoverer's personal impressions of the flora, but he leaves none in his diary. The time of year, it is true, was not the most favourable, but his imagination was already fully occupied with the marvellous agricultural possibilities of the Loddon and Wimmera plains, through which he had just passed. The famous cognomen, "Australia Felix," first came from his pen, an inspiration from these plains; and Mitchell was the first man to prophesy the teeming population of rural workers this country would one day carry. Compared with this, the mountains, to his mind, would be a wild waste of rock. Nevertheless, he was practical enough to carry away some specimens of the common plants of Mount William. These passed into the hands of Lindley, and received their scientific names. Some of these were *Tetratheca ciliata*, *Daviesia brevifolia*, *Pultenæa mollis*, *Dillwynia hispida*, *Eucalyptus alpina*, *Cryptandra tomentosa*, and *Grevillea aquifolia*.

Then came Dr. (afterwards Baron von) Mueller in 1853,* when the secrets of the mountain's flora were exhaustively laid bare. What few species that illustrious botanist failed to enumerate were brought subsequently before him by his disciples and able assistants, Mr. John Dallachy and Mr. Daniel Sullivan, of Moyston. The lists published by the latter gentleman appeared in the *Southern Science Record*, vols. ii. (1882) and iii. (1883), and in the "Proceedings of the Australasian Association for the Advancement of Science," Melbourne meeting, 1890. The second list will be taken as the basis of all future compilations of Grampian flora. Further small additions were made in the report of the Field Naturalists' Club visit to the Grampians in 1891 (*Vict. Nat.*, viii., p. 181), and in a paper by Mr. G. Weindorfer which appeared in the *Victorian Naturalist*, vol. xxii., p. 48. That Sullivan's list (erroneously called a complete census) has been added to by some 136 species is sufficient excuse for this present attempt to bring the census up to date. The total now of 686 species of flowering plants and ferns is no mean one, and it places the Grampians in a proud position among plant areas of this State.

* See *Vict. Nat.*, xxi., p. 19.

The time is not far distant when more attention will be paid to geological considerations in connection with plant lists. The association of native plant life with soil, and therefore with the mother rock that produced it, is not yet recognized in its full importance. Nevertheless, it is safe to say that a definite rock, producing a definite set of soil conditions, in turn expresses itself in a definite type of plant-life, patent to all observers. Therefore, associated with the publication of any plant list there should be an introductory statement of the features, both geological and geographical, of the area under notice.

The Grampian formation * lies in Western Victoria, about meridian 142° 30′, and between the 37th and 38th parallels, in general shape much like that of a giant boomerang. Mount William, the culminating point, rising 3,830 feet above sea level, is on the bend, while one terminating point, Mount Zero, is 32 miles N.N.W., and the other, Mount Sturgeon, is 28 miles S.S.W. The formation embraces several series of ranges. The northern half is the Difficult Range, the Grampians proper lie much about the central position, while the Serra Range—perhaps the most remarkable of all the series—runs from Mount Rosea, behind Mount William, including Middleton, D'Alton, Lubra, and Frederick Peaks, to Mounts Abrupt and Sturgeon, near Dunkeld. A score or more of unnamed peaks in this chain rise 2,000 feet above the plains. West of the Serra is a parallel range called the Victoria Range, while west of Mount Difficult is the Black Range. Two separate outliers of the same rock are Mount Dundas (west of Victoria Range) and Mount Arapiles (near Natimuk). They are both about 20 miles distant from the main mass. A tourist map at present in course of compilation by the Lands Department will do much to open up the district, and enable visitors to understand the topography, which cannot be gained from the usual maps.

The whole of this mountain system consists of sedimentary rock of a sandstone nature. There may be much variety in texture, from fine-grained freestone to coarse and rough sandstone (sometimes with included lumps of quartz); but there is no shale or slate. Bands of hardened quartzite are found in places. The Grampian sandstones are thought to be of Devonian age, but lithological nature and stratigraphical position are the only grounds upon which this classification is based. The nature of the deposits is such that fossil evidence has not been preserved to us. The colouration of the rock is from yellowish-white to rich reddish-brown; but the prevailing soil is loose and sandy, from whitish to nearly black in colour, according to the quantity of

* See "Rambles Round the Grampians," *Vict. Nat.*, xxvii. (1910), p. 31.

included humic matters. The whole formation of these old red sandstones has a dip in a westerly direction at a low angle, with the exception of Mount Dundas and the Black Range, which dip approximately eastward, thereby indicating a synclinal axis between them and the rest of the formation. The remarkable and regular dip gives rise to scenery at once striking and characteristic. There is a gentle westward slope to all the hills, while to the east the beds of rock break off abruptly in bold escarpments and almost vertical cliffs.

How much plant-life is governed by these conditions may easily be imagined. With a good rainfall (Pomonal has averaged 32 inches for the past 11 years), the mountains give shelter to plants of many genera that otherwise would not find foothold. With varying site and shelter, plants found in a Mallee census obtain the conditions they love in warm and dry quarters; while not far away, in some shaded glen, representatives of the Gippsland flora flourish. But, apart from this, the characteristically Grampian conditions are expressed in plants of much botanical interest. A score or more, most prominent among which are *Eucalyptus alpina*, *Thryptomene Mitchelliana*, *Calycothrix Sullivani*, *Grevillea oleoides*, *Bauera sessiliflora*, *Prostanthera debilis*, *Pultenæa mollis*, *P. rosea*, *Candollea sobolifera*, and *Stypandra glauca*, are widespread in, yet restricted to, the old red sandstones.

For reasons indicated above, it is to be regretted that the census of the Grampian flora published by the late Mr. Sullivan was in association with a plant-list of the Pyrenees. The very position of the Grampian mountains, lying approximately north and south, in antithesis to the general direction of the Pyrenees, broad valleys and open country separating them as well, indicates an essential difference in the character of the country. The Pyrenees are as different to the Grampians as are the Australian Alps. They mark the western limit of a flora which obtains throughout the central Ordovician highlands of Victoria, while the Grampian flora is distinctly associated with that of north-western Victoria and adjacent portions of South Australia.

Baron von Mueller, in the "Key to the System of Victorian Plants," includes the Grampians in the south-western portion of the State; but this must be taken as a matter of convenience, and is far from arbitrary, for the opening page of Part II. of the "Key" gives the explanation of the geographic indications to be "S.W., the region from the sources of the watercourses in the south-west to the coast west of Cape Otway." A large portion of the Grampians is therefore included, since the sources of the Wannon River are in the vicinity of Mount William; but a still larger portion must also be included in

the "N.W. region, from the sources of the watercourses in the north-west to the Murray," for about Mount William streams which eventually empty into the Wimmera take their rise.

The plan adopted by Mr. Sullivan in the *Southern Science Record*, of stating the general conditions under which each species grew, was both interesting and educational.

In the A.A.A.S. 1890 list there is a total of 550 species of Phanerogams and Acotyledoneæ for the Grampians. Forty-five of these were recorded for the first time for the south-western region of Victoria.* No less than eight common plants, however, are overlooked, though they are recorded as Pyrenees only. I venture to suggest that this is due to clerical error, which might not have occurred had the Pyrenees plants not been associated with the Grampians list. Some species, like *Drimys aromatica*, appear to be doubtful, for in the "Census" the bare name appears without any reference whatever to locality. I wish to point out, further, that I think Mr. Sullivan overstepped the geographical margin of the Grampians in certain instances. I find such species as *Myosurus minimus*, *Samolus repens*, *Polygonum minus*, and *Selliera radicans* referred to in the marginal notes of *Southern Science Record* list as pertaining to saline flats, brackish creeks, and clay banks of creeks. Now, such localities do not occur in the Grampians, but possibly refer to the vicinity of Moyston, 8 miles away, the village where Mr. Sullivan lived. *Styphelia strigosa*, I have little hesitation in saying, belongs properly to the low, gold-bearing, Ordovician ridges near the Grampians, and not to the Grampians themselves. The genera Eryngium, Velleya, Lepidium, Calocephalus, and Swainsona savour of the rich plains adjacent, and not of the old red sandstones. I contend that a plant census of the Grampians should confine itself to those plants actually growing upon the mountains' sandy strata. The direct influence of the rock peculiar to the Grampians ceases when the step is taken on to the clay or loam of the Tertiary plains about their base.

The Field Naturalists' Club added sixteen species to the list of the Grampian flora (*Vict. Nat.*, viii., p. 181), as the result of its excursion to the mountains in November, 1891. Three of these—namely, *Glycine tabacina*, *Styphelia australis*, and *Caleya minor*—were new records for the south-western region. Not till 1905 were any further additions made, when Mr. G. Weindorfer published a list in *Vict. Nat.*, vol. xxii., p. 48, which added no less than forty-four species,† four of which, again—*Comesperma*

* In *Vict. Nat.*, x., p. 159, and xix., p. 104, appear many additions to geographic distributions of the "Key."

† NOTE.—One of these, *Prostanthera denticulata*, was probably collected on the hills near Stawell *en route* to the Grampians. It is not found on the mountains.—A. G. C.

ericinum, *Callitris verrucosa*, *Pimelea axiflora*, and *Sagina procumbens*—were new to the south-west. This makes the number of plants enumerated in published lists to date 610 species. The remainder, some 76 species, now recorded by the present writer (twelve of which are new to the south-west) brings the Grampian census to the number of 686 species.

Before concluding, I desire to acknowledge the assistance received from the National Herbarium, through the kindness of Prof. Ewart, in identifying many of the difficult or doubtful specimens, which proved to be new to the district, and are recorded in the list herewith.

In the following list are given the names of those plants added to the Grampian flora since the publication of Sullivan's census of 1890. Those marked with an asterisk only were, however, included in Sullivan's list, but were not recorded from the south-west in the "Key to the System of Victorian Plants," 1885.

REFERENCE MARKS.

* Not recorded S.W. in "Key to Victorian Plants," 1885.
† Field Naturalists' Club additions, 1891.
‡ Additions by Weindorfer, 1905.
§ Recorded by A. G. Campbell, 1911.

* Hibbertia diffusa, R. Br.
* Drimys aromatica, F. v. M.
*§ Papaver aculeatum, Thunb.
§ Hybanthus floribundus, F. v. M.
* Billardiera cymosa, F. v. M.
*‡ Comesperma ericinum, Cand.
* ,, defoliatum, F. v. M.
* Eriostemon Hillebrandi, F. v. M.
* Geranium sessiliflorum, Cav.
‡ Pelargonium Rodneyanum, Mitc.
‡ Casuarina quadrivalvis, Lab.
§ ,, suberosa, Otto and Diet.
* Dodonæa bursarifolia, Behr. and F. v. M.
*§ Claytonia volubilis, F. v. M.
*‡ Sagina procumbens, Linné.
§ ,, apetala, Linné.
§ Ptilotus spathulatus, Poiret
* ,, alopecuroides, F. v. M.
§ Mesembryanthemum æquilaterale, Haw.
§ Rumex bidens, R. Br.
* Polygonum strigosum, R. Br.
§ Gompholobium minus, Sm.
§ Sphærolobium daviesioides, Turcz.
§ Daviesia corymbosa, var. mimosoides.
§ ,, ulicina, var. ruscifolia.
‡ Pultenæa Benthami, F. v. M.
* Pultenæa subumbellata, Hook.
§ ,, humilis, Benth.
* ,, villifera, Sieb.
* Dillwynia hispida, Lind.
*§ Templetonia sulcata, Benth.
§ Lotus corniculatus, Linné.
§ ,, Australis, Andr.
*† Glycine tabacina, Benth.
§ Acacia diffusa, Edw.
§ ,, acinacea, Lind.
§ ,, stricta, Willd.
*§ ,, penninervis, Sieb.
§ ,, implexa, Benth.
*§ ,, longifolia, var. mucronata.
‡ ,, mollissima.
§ ,, dealbata, Link.
* Alchemilla vulgaris, Bau.
† Leptospermum myrtifolium.
† Kunzea parvifolia.
* Callistemon coccineus, F. v. M.
§ ,, salignus, Cand.
† Melaleuca ericifolia, Sm.
* Eucalyptus pauciflora, Sieb.
* ,, amygdalina, Lab.
* ,, macrorrhyncha, F. v. M.
* Pomaderris vaccinifolia, Reis. and F. v. M.
† ,, subrepanda, Reis. and F. v. M.

‡ Cryptandra D'Altoni, F. v. M.
‡ ,, tomentosa, Lindl.
† ,, Hookeri, F. v. M.
‡ Hydrocotyle hirta, R. Br.
* Didiscus pusillus, F. v. M.
‡ Trachymene Billardieri, F. v. M.
§ Loranthus linophyllus, Fenzl.
§ ,, quandang, Lindl.
§ Persoonia, sp.
‡ Grevillea oleoides, Sieb.
*§ ,, oleoides, var. angustifolia.
* ,, Australis, R. Br.
‡ Hakea pugioniformis, Cav.
* ,, acicularis, R. Br.
* (?) ,, dactyloides, Cav.
‡ Banksia integrifolia, Linné *fils.*
*‡ Pimelea axiflora, F. v. M.
‡ ,, octophylla, R. Br.
‡ Sambucus Gaudichaudiana, Cand.
§ Brachycome cardiocarpa, F.v. M.
§ ,, ciliaris, Less.
‡ Minuria leptophylla, Cand.
§ Aster pannosus, F. v. M.
‡ ,, ramulosus, Lab.
§ ,, microphyllus, Pers.
* (?) ,, aculeatus.
‡ Helichrysum lucidum, Henck
‡ ,, leucopsidium, Cand.
* (?) ,, bracteolatum, Benth.
‡ Craspedia Richea, Cass.
* Senecio vagus, F. v. M.
‡ ,, dryadeus, Sieb.
‡ Erechtites prenanthoides, Cand.
‡ ,, arguta, Cand.
§ ,, quadridentata, Cand.
§ Cymbonotus Lawsonianus, Gaud.
* Lobelia concolor, R. Br.
‡ ,, pedunculata, R. Br.
‡ Candollea serrulata, Lab.
§ ,, perpusilla, F. v. M.
‡ Limnanthemum exaltatum, F. v. M.
§ ,, crenatum, F. v. M.
† Mitrasacme pilosa, Lab.
§ Dichondra repens, Forst.
§ Solanum vescum, F. v. M.
§ ,, aviculare, Forst.
† Mazus pumilo, R. Br.
‡ Cynoglossum latifolium, R. Br.
‡ Prostanthera denticulata, R. Br.
† Styphelia lanceolata, Sm.
*† ,, Australis, F. v. M.
§ ,, virgata, Lab.
§ Styphelia serrulata, Lab.
§ ,, costata.
§ Brachyloma ericoides, Sond.
* Epacris obtusifolia, Sm.
§ Sprengelia incarnata, Sm.
*‡ Callitris verrucosa, R. Br.
§ Spiranthes Australis, Lindl.
§ Thelymitra aristata, Lindl.
† ,, fusco-lutea, R. Br.
§ Diuris punctata, Sm.
§ ,, maculata, Sm.
§ Orthoceras strictum, R. Br.
† Calochilus Robertsoni, Benth.
* ,, campestris.
§ Prasophyllum fuscum, R. Br.
*§ ,, fimbriatum, R. Br.
* Pterostylis concinna, R. Br.
† Caleya minor.
* Acianthus caudatus, R. Br.
† Caladenia Patersoni, R. Br.
*§ ,, filamentosa, R. Br.
*§ ,, congesta, R. Br.
§ ,, cœrulea, R. Br.
* Dianella Tasmanica, Hook.
§ Arthropodium paniculatum, R. Br.
§ ,, laxum, Sieb.
† Bartlingia sessiliflora, F. v. M.
* (?) Triglochin nana.
‡ Potamogeton obtusifolius, Mert. and Koch.
‡ Xyris operculata, Lab.
‡ Centrolepis fascicularis, Lab.
† Lepyrodia Muelleri, Benth.
‡ ,, Tasmanica, Hook.
‡ Leptocarpus tenax, R. Br.
* Cyperus difformis, Linné.
§ Scirpus setaceus, Linné.
‡ ,, inundatus, Spreng.
*§ ,, prolifer, Rottb.
* Schœnus imberbis, Hook.
‡ ,, apogon, Roem. and Schul.
§ ,, sphærocephalus, Poir.
‡ Lepidosperma elatius, Lab.
§ ,, exaltatum, R. Br.
§ ,, concavum, R. Br.
§ ,, laterale, R. Br.
‡ ,, carphoides, F. v. M.
‡ Cladium tetraquetrum, Hook.
§ ,, radula, R. Br.
* Caustis flexuosa, R. Br.
‡ ,, restiacea, F. v. M.
§ ,, pentandra, R. Br.
§ Carex inversa, R. Br.
§ ,, Gaudichaudiana, Kunth.
‡ ,, pseudocyperus, Linné.

* (?) Carex adpressa.
* Lepturus incurvatus, Trin.
§ Hemarthria compressa, R. Br.
* Stipa scabra, Lindl.
‡ Echinopogon ovatus, Pal.
‡ Agrostis quadriseta, R. Br.
*§ Cynodon dactylon, L. Rich.
§ Chloris truncata, R. Br.
* (?) Festuca distichophylla.
* Triodia irritans, R. Br.
§ Distichlis maritimus, Rafin
§ Bromus arenarius, Lab.
* Schizæa dichotoma, Sm.
§ Hymenophyllum nitens, R. Br.
* Dicksonia davallioides, R. Br.
§ Lomaria discolor, var. bipinnatæ.
* (?) ,, procera.
§ Woodwardia aspera, Mett.
§ ,, caudata, Cav.
*§ Aspidium Capense, Willd.
* Polypodium grammitidis, R. Br.
* ,, scandens, Forst.

PLANT NAMES.—The second instalment of the provisional list of common names for indigenous plants appeared in the *Journal of Agriculture* for August. The committee will be pleased to have any criticism as early as possible.

SOME UNUSUAL BIRD VISITORS IN THE MALLEE.—The sight of a strange bird occasionally is to the ornithologist like a new lease of life. It affords material for speculation as to the probable reason for such unexpected appearance, and, in the case of birds that are "old friends," revives pleasant memories of old associations. Thus, the advent, a few days since, of a flock of about twenty Black Cockatoos, *Calyptorhynchus funereus*, and especially the sound of their strange cries as they flew leisurely overhead, reminded the writer forcibly of the days when, as a lad, he roamed the bush near Langi-Ghiran, in the Pyrenees, "the home of the Black Cockatoo." A short time before this, about the beginning of August, a solitary specimen of the Kookaburra, *Dacelo gigas*, suddenly appeared one day in the farm-yard, and from a point of vantage kept swooping down on the mice infesting the haystack. When successful in his raid the Kookaburra would return to his perch, and swallow the unfortunate victim whole. A pair of Nankeen Kestrels, *Cerchneis cenchroides*, which for a long time past have regarded this particular farm-yard as their special preserve, were much incensed at this invasion of their precincts, darting incessantly at the intruder, exhibiting many pretty turns and surprising evolutions of flight meanwhile. The Kookaburra, however, took no notice of these assaults beyond presenting his great beak towards the enemy. He stayed about for a day or two, and then vanished as suddenly as he came. The third visitor was a specimen of the Black-cheeked Falcon, *Falco melanogenys*, a bird which I have not previously seen in the Mallee; and, lastly, the Silver Gull, *Larus novæ-hollandiæ*, flocks of which have regularly appeared for some seasons past, frequenting the various water-holes and swamps in the Sea Lake and Ultima districts.—J. C. GOUDIE. Sea Lake, 15/8/11.

FROM HEALESVILLE TO MOUNT DONNA-BUANG.

By REGINALD KELLY.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1911.)

On hearing of the proposed visit of the Ministerial party to Mount Donna Buang on 26th June last, a horseback party was hurriedly arranged in Healesville to ride through from that town to meet the visitors on the snow-laden summit. The official party went from Warburton—a stiff climb of about four miles: the Healesville trip, by present route, though less steep, is about fourteen miles. About 8.30 a.m. I left Healesville with the first troop of 42 horsemen, led by Assistant Forest-Ranger Burns. It was a cold, sharp morning, with every promise of a bright day. Each man carried his own provisions and a pannikin.

The Don road, which we traversed as far as the Badger River, is well known to many of the members of this Club, and those naturalists whom I had the pleasure of accompanying to the Badger Weir on the 31st January, 1909, will remember where we crossed the stream half way up from the road. Here the river was a raging torrent after the recent floods. The sloping banks were laid with corduroy, but it was loose and slippery. Many of the horses baulked, plunged, and caused confusion, but all crossed. The track from this point went up the Badger valley for a short distance, bearing away gradually to the right till out of the characteristic gums and wattles of the flats. These principally consisted of *Eucalyptus viminalis*, *E. gunnii*, with a few *E. obliqua* and *E. amygdalina*, and of *Acacia melanoxylon* and *A. dealbata*, with here and there a *Hedycarya Cunninghami* and *Pomaderris apetala*.

Leaving behind the vegetation of the river flat, a bridle path goes east by south along the lower undulating slopes on the east side of the hills, over which goes the road to Malleson's Look-out. To the casual observer these slopes were simply waving fields of bracken, *Pteris aquilina*; but that it was once densely timbered is soon learned by one who leaves the track, for this bracken is a tangle of dead boughs and tree-trunks. These, too, at times stretch across the path, and unfortunate is it for him whose horse cannot negotiate them, for so full of obstacles and pitfalls is the way that he must go over or go back. Towards the end of the fields of bracken, and through the last mile of it, the track ascends, slightly winding, up a stiff pinch, difficult to negotiate, as one must keep on the track to lead one's horse, the sides being too tangled for walking; the horse naturally rushing, and the leader naturally puffing, the animal runs him down. Fortunately, my light weight and my horse's strength saved me from this dilemma, for, after a

short struggle, I remounted and finished the climb with more comfort to us both.

After this toilsome part of the journey we encountered a more gradual but rougher way. Loose stones and slippery outcrops of dacite, with logs, from saplings to trunks of the largest trees, strewed the way. Here, as we rode, still in Indian file, along the backbone of the ridge running westerly from the Dividing Range, which separates the head waters of the Graceburn and Watts from the Badger, and in which the high peak called Donna-Buang occurs, the flora and the scenery began to change. Looking away westerly towards Yarra Glen, large sheets of flood waters, lake-like on the flats, could be seen, whilst across them the morning train was steaming along the viaduct. On our left front, whilst looking towards Yarra Glen, was Launching Place, plainly visible; and to the right, the highest houses of Healesville, appearing as outposts at the foot of Mount St. Leonard. Thus, *Eucalyptus amygdalina* gave way to *E. regnans*, while *E. obliqua* took on the mountain form that bushmen call "Menindie," and which, in my opinion, is *E. hæmastoma*. Riding in close quarters, back and front, with no chance to go aside, note could be taken of nothing smaller than medium-sized shrubs. Among these were *Olearia* (*Aster*) *argophylla*, stunted, and with many stems, and what was apparently *O.* (*Aster*) *stellulatus* in alpine form; *Acacia dealbata*, whose foliage was so like that of *A. mollissima* as almost to convert one to Maiden's grouping of these two as varieties of *A. decurrens*; but, as there was neither blossom nor bud, it is safer with such casual observation to reserve identification.

At this stage, which was about half way, someone ahead had halted the troop—a fallen tree was being negotiated. Suddenly a voice at the back called out. "Look at those holly berries! Get some." One of the party moved into the scrub. I guessed what the hollies were, and had some passed along; they were the fruit of *Coprosma hirtella*, and magnificent specimens, too —luscious, and about twice the usual size Many a stunted bush of this plant had been passed recently. The next plant to attract my attention was an Eriostemon in bud. Scattered along the way, high up on the ridge, were several bushes. I could reach them from the saddle, but they were too tough to pick. Several stems sprang from each root. The leaves were very large and thick, emitting a fœtid smell when crushed. My nearest companion secured two pieces for me (I had but one when I returned, and that I take to be *E. myoporoides*). A little further on we came to the first snow—light flakes sparsely scattered. The aneroid showed 2,000 feet above Healesville (267 ft.), and we had come but little more than half way. It was not the first snow that we had seen, for on peaks ahead, and

to our left front, where the Divide lay behind Mount Riddell, it was massed in dazzling whiteness in the sun, which, about 11 o'clock, shone brightly. Each step the white carpet became thicker, and covered the horses' hoofs, but those ahead had trampled a trail for us. Here we came to a magnificent grove of the Mountain Wattle, or Hickory, as it is sometimes called, *Acacia penninervis*, somewhat resembling, and taken by many to be an alpine form of, *A. pycnantha*. To our left, which would be about east by north, ran a deep valley running almost east and west, and, strange as it seemed to me, the bottom of it was filled with snow like a frozen river, whilst on the lower hillsides beyond there was none. The snow on our track soon became much deeper—almost to the horses' knees. The lesser logs were covered save where the foremost horses had bared them. The larger ones were banked up; sometimes two lying parallel made jumping a care. There was little opportunity for botanical observation, save of the larger objects, and none for examination.

Fine old beeches, *Fagus Cunninghami*, hoar-tipped and festooned with moss, the dark green of the leaves brightened with weepers of the moss *Hypnum denticulatum* and blue with lichens, now came in view. The eucalypts were tall, white-stemmed, and staggy-topped, many of them *E. regnans* It mattered little, however, whether it was the fallen trunk of this forest giant that threatened to bring one's mount a cropper or the standing one of the *E. goniocalyx* that almost brushed him from the saddle; both gums are there in abundance. I have forgiven the timber cutter for calling the last-named tree "blue gum." We passed many saplings of this species, and I have seen nothing so like the juvenile forms of *E. globulus* as these, save *E. globulus* itself. The stems were squared, the angles flanged with rims of decurrent bark—the boughs and branchlets too. The rounded young leaves, the long, broad, sickle-like adolescent foliage, completed the resemblance to the true blue gum, a darker green replacing the glaucous colouring. Taking these young trees individually, lacking fruits or flowers, one might be excused for saying that *E. globulus* flourishes on the flanks of Donna-Buang. It is worth the journey to see these saplings only.

Near to the track as it passes through the clumps of beeches are a few other trees, which, if they be a species of Notelæa, are the largest I have seen; but at this part the exigencies of this journey gave no chance of making sure of their identity, and I would not like to say they were not *Persoonia arborea*. After passing these, and we had seen Warburton lying in the Yarra valley on our right, lit by the lamps of Phœbus's chariot, snow from two to three feet deep lay ahead, and on either side,

as far as we could see. I was told that on the plateau there was little else but dwarf snow-gums. Hence I expected to find *Eucalyptus coriacea*; but if these dwarf gums are not stunted forms of *E. obliqua* I am mistaken. Soon I hope to have an opportunity to examine them more closely. At stages on the way a lax form of Stellaria hung gracefully from decaying tree-limbs, but now the smaller plants were hidden. Overhanging boughs and tangles of prostrate trees and projecting limbs covered with snow impeded our progress at times, occasioning sometimes a delay in crossing, sometimes an ugly flounder as we crossed, and once, at least, a dismount. An occasional patch of treacherous mire changed the colour of things. One in particular was blackness itself. It was a slough, but not of despond. We and our hopes were getting higher. At noon we reached the summit, 4,080 feet above sea level—a fitting hour for the achievement. The snow at the top, after being trodden hard, was about three and a half feet deep, while the drifts were very much—perhaps in places two feet—deeper. At the place where we met the Warburton party a large space had been cleared, and we were enclosed by a ring of timber, so that no views were obtainable. The opening up of vistas, however, is fast being proceeded with. Within this circle we tethered our horses to trees and fallen boughs, and lunched. A fire was roaring in a snow-pit formed by a hole recently occupied by the roots of a large eucalypt, and a plentiful supply of tea and hot water was available.

After remaining on the summit a couple of hours and listening (or not listening) to speeches typical of such occasions, we sought our mounts, many of which had sunk to their girths in the snow. The return journey was not *facilis decensus*, but it took rather less time than the ascent. On the way up we had seen tracks of wallabies in the snow, and fresh tracks were noticed on our return. In the neighbourhood of Ben Cairn Rock, which lay at some distance to the south of the track, a small party detached themselves from the main body and made a detour to see if a road could be found *via* that interesting object. I believe their expedition promises a successful issue. This plateau (3,350 ft. above sea-level), it will be remembered, was visited by a Club party from West Warburton in January, 1910 (*Vict. Nat.*, xxvi., p. 185). About this point we passed through a thick mist, which hung only to the higher levels. The down grade riding at the stony patches and the steep pinch I mentioned before required considerable care, but, with no mishaps of any consequence, we reached home about 5 o'clock.

As I write this a party of ornithologists is visiting the mount from the Warburton side. It is hoped they will be rewarded with a sight of something in their own particular line,

for neither going nor returning did I see a feather. This trip, as you will see, was not one that could by ordinary canons be called a naturalists' excursion, but was undertaken by a party who were otherwise not naturalists, with the object of getting there to meet political visitors and point out the claims of the Healesville route.

Whilst on this subject it may not be out of place to discuss the name of the mountain peak. I have used the name Donna-Buang, as that is the one now adopted, but in my opinion carelessly. In the first place, there is no "d" in the aboriginal language. That the word "Donna" is, as one of our daily journals says, the same in the language of our natives as in the Spanish, is ridiculous. That the name in any form applies to this peak is more than doubtful. The nearest approach to "d" is "th." The range just above Malleson's, and between that and Woori Yallock, is "Toole-be-wong." I have made careful investigations, and find that the last name is a nearer interpretation of the word, and Donna-Buang is a corruption. Toole-be-wong faces towards the aboriginal station at Coranderrk. It and the ranges behind are the homes of the floating mist. The old Yarra tribes included this part of the horizon in one sweep with an expression which is nearly interpreted as "Thuonna-be-wong," meaning "the place of the mist."

Aboriginals, like many coloured races, have a weakness for acquiescence to suggestion. For instance, the nearer range is pointed out and the question is asked, "What name that?" "Thuonna-be-wong," or the ear may catch it as "Toole-be-wong." The peaks beyond are pointed to; the same answer is given in slightly different inflection of voice, and perhaps by another individual. It is all the land of the mists. Bearing out this view, it is significant that in Brough Smyth's "Aborigines of Victoria," vol. ii., p. 188, Mount Riddell (which is in that sweep of hills which, as viewed from Coranderrk Aboriginal Station, extends from Mount St. Leonard to Toole-be-wong) is called "Koranderrk" or "Turnim-be-wong." On page 162 of the same work the word "boo-rong" means mist. The same word on page 135 is given as "the firmament."

The late Mr. Joseph Shaw, for many years superintendent of Coranderrk, always considered that the natives applied the name "Thuonna-be-wong" to the eastward extension over Malleson's Look-out of the part now called Toole-be-wong. Some say that the name Donna-be-wong or Donna-buang means "Queen of the Waters"; others that it means "the place of rotten wood"; but in favour of these definitions no evidence has been adduced.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART III.—STAPHYLINIDÆ.

BY J. C. GOUDIE.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1911.)

(The previous parts of this paper (*Vict. Nat.*, xxvi., p. 39, and xxvii., p. 153) dealt mainly with the Carabidæ and the water-beetles.)

THE beetles belonging to the family Staphylinidæ are, as a rule, easily recognized, being quite dissimilar in general appearance from most other coleopterous forms. On a casual inspection they appear to have more affinity to the Forficulidæ, or earwigs, though the body does not terminate, as does that of the earwigs, in a forceps. The very short elytra, and the long, slender abdomen, which is freely movable, being the chief distinguishing characters.

Most of the species are met with on the ground under *débris* of any kind, and specimens of some kinds may be seen in the streets of the city, as well as in the remotest parts of the bush. The members of one genus pass their time amongst the blossoms of trees, whilst others are found exclusively in the nests of ants, being there probably in the capacity of scavengers, though some, as Mr. Lea has remarked, are hostile to the ants. In the drier portions of the country many species frequent the margins of water-holes, and may be swamped out of their hiding-places by throwing a few buckets of water on the caked mud. Mr. Froggatt says they are carnivorous, devouring other small creatures, and several species are carrion feeders. Considering their somewhat unattractive appearance (compared with other coleoptera), the Staphylinidæ have been well investigated, the researches of Messrs. Fauvel, Macleay, Blackburn, Lea, Olliff, and others having made known upwards of 400 Australian species.

There appears to be but little known of the early stages of these insects. I have not seen the larvæ or pupæ of any species to my knowledge, though they must be numerous; but the beetles themselves may be taken all the year round.

STAPHYLINIDÆ.

1164. *Aleochara brachialis*, Jekel.
7655. *A. puberula*, Klug.

These two species are carrion feeders. I have not met with them except near the bodies of dead animals or birds. *A. brachialis* is black, with a red-tipped body, and measures a quarter of an inch in length. *A. puberula* is smaller, with reddish-brown elytra.

7682. *Homalota sordida*, Marsham.

A small black species ($\frac{1}{8}$ of an inch), with brownish or piceus elytra. The measurements given in these notes are those of dried specimens. When alive, the dimensions would be somewhat larger, as the soft integument of such insects as Staphylinidæ, Malacodermidæ, and others shrink considerably after death.

7684. *Dabra myrmecophila*. Oll.

D. nitida, Lea, Proc. Roy. Soc. Vic. (new series), xxiii., p. 133.

D. termitophila, Lea, var. *victoriensis*, Lea, *loc. cit.*, p. 134.

The species of this genus have only been found, so far as I know, in the nests of ants and termites. They closely resemble each other in appearance, requiring a critical examination to separate them. Brown in colour, and about $3\frac{1}{4}$ mm. in length. They run freely about in the nests of the ants, who seem to regard them with friendly tolerance. *D. termitophila*, as its name implies, has been taken in the galleries of "white ants." In two papers communicated to the Royal Society of Victoria (1904 and 1910), Mr. Lea has dealt very fully with all the species of Australian beetles known to inhabit the nests of ants, bees, and termites, describing several new genera and a large number of new species, with finely-drawn figures of many curious forms.

Glyptoma kingi, Lea, *loc. cit.*, p. 142.

A rare species, also associating with ants (*Iridomyrmex nitidus*). It is smaller than the species of Dabra ($2\frac{1}{4}$ mm.), and is of a bright chestnut colour, with strong costæ near outer margins of prothorax and elytra.

1219. *Conosoma elongatulum*, Macl.

This is a wedge-shaped insect, broad in front and tapering behind, dark brown or piceus in colour, and about $\frac{3}{16}$ of an inch long. One of my specimens was taken in an ants' nest (*Ponera lutea*), but it is doubtful whether it is a regular inhabitant, though several other species of the genus are known to be myrmecophilous.

1236. *Heterothops picipennis*, Fvl.

Occurs rather frequently, like many other species, in the vicinity of sheep-yards, stables, &c. It is $\frac{1}{6}$ of an inch in length, and is black, or nearly so, with piceus elytra.

7700. *Quedius andersoni*, Blackb.

A distinct species, not uncommon, measuring $\frac{1}{3}$ of an inch. The head is black, round, and shining, and both prothorax and elytra are bright red, the latter thickly beset with yellowish setæ.

7708. *Q. ruficollis*, Grav.

Rather larger than *Q. andersoni*, and differs in having the

strongly punctate elytra black, and with the caudal appendages more developed.

1262. *Creophilus erythrocephalus*, Fab.

The largest of the Mallee Staphylinidæ. It is a well-known species, being widely distributed over Australia. It measures from $\frac{3}{8}$ to $\frac{3}{4}$ of an inch in length, and is of robust build. The head is red, with a round black spot between the eyes. The antennæ are distinctly thickened to the tips. Body and legs black, and elytra of a metallic blue. It is often seen running about in stables with the hinder end of body curled up over its back. A defunct sheep or kangaroo is a strong attraction to this insect. An allied European species is known by the rather absurd popular name of "Devil's Coach-horse."

7719. *Philonthus nigritulus*, Grav.

7721. *P. sordidus*, Grav.

These are shining black, with elytra and appendages paler, the former $\frac{3}{16}$ and the latter $\frac{1}{4}$ of an inch long.

1255. *P. subcingulatus*, Macl.

This species has a wide range, being recorded from all the States, including Central Australia. It is $\frac{1}{4}$ of an inch long, with a black head, brown elytra and body, and bright red prothorax.

1296. *Leptacinus socius*, Fvl.

1299. *L. luridipennis*, Macl.

These are narrow, elongate insects, slightly over $\frac{1}{4}$ of an inch in length. The former is uniformly black, and the latter brown, with pale appendages.

1319. *Scymbalium arcuatum*, Fvl.

Of the same narrow form as the last-mentioned. The head and prothorax are black, and the disc of elytra suffused with red.

Dicax australicum, Sol.

This species is not recorded by Masters, unless included in another genus. It measures $\frac{1}{2}$ inch in length, and is jet black, with the head strongly punctate and armed with powerful jaws. The prothorax also is deeply punctured, and the elytra striate. Rare in this district.

1338. *Cryptobium fractum*, Fvl.

A narrow, shining black insect, not unlike *Leptacinus socius* in general appearance.

1354. *Pæderus cingulatus*, Macl.

This is a rather gaily coloured species, measuring $\frac{1}{4}$ inch long. The head is black, prothorax red, elytra blue, and the body yellow, with a blue tip. It is generally found near water.

7767. *Sunius æqualis*, Blackb.

Usually met with amongst the stems or roots of grass tussocks; also recorded by Mr. Lea as being "an occasional visitor to ants' nests under stones." It is about $\frac{3}{16}$ inch in

length, of a pale brown or testaceus colour, and is very narrow and fragile in build.

Pinophilus.

Bledius.

An unnamed specimen of each of these genera is in my collection.

7784. *Oxytelus sculptus*, Grav.

1418. *O. sparsus*, Fvl.

1420. *O. subæneus*, Fvl.

Small, obscure species, occurring in damp situations.

1427. *Amphicroum australe*, Fvl.

Frequents the blossoms of eucalypts, whether in search of nectar or minute insects is not clear. Unlike typical examples of the family in being short and comparatively broad in form. It is $\frac{1}{8}$ inch in length, and testaceus in colour.

This concludes the list of Staphylinidæ, with 26 species and one variety. There are a few not identified, which may be included in a future supplement. The next paper in this series will deal with the Pselaphidæ, Paussidæ, and Scydmænidæ.

CORRESPONDENCE.

THE QUAIL SEASON.—A CORRECTION.

To the Editor of the Victorian Naturalist.

SIR,—In my paper on the alterations in the *Game Act* an error inadvertently occurs in two places. Instead of "14th February," it should read "Wednesday, 15th February." By inserting the above correction you will greatly oblige yours, &c.,

G. A. KEARTLAND.

WATTLE DAY.—The first Melbourne celebration of Wattle Day was held on 1st September, when signs of the national flower were in evidence in many places. On Tuesday, 5th September, the Wattle Day League was formally inaugurated at the Town Hall, when, in connection with the Royal Horticultural Society's daffodil show, there was a display of blooms of various species of Acacia, thanks principally to the energy of the promoter, Mr. A. J. Campbell, and his son, Mr. A. G. Campbell, of Pomonal. They suffered, however, from juxtaposition to the more brilliant garden flowers, such as daffodils, heaths, cinerarias, &c., and, to enable the public to judge of their merits, will have to be displayed by themselves, or with the more delicate native flowers then blooming.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th October, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 60 members and visitors were present.

CORRESPONDENCE.

From Mrs. Edw. Bage, a life member of the Club, suggesting that the Club should subscribe to the Mawson Antarctic Exploration Fund, and enclosing a cheque for one pound as the nucleus of a contribution.

The hon. secretary said that the matter had been discussed by the committee, who considered it a matter for the general meeting to deal with. The object was a laudable one, but, in view of the diminished bank balance, whether the Club should contribute out of its funds or the members as separate individuals seemed to be the real question.

Mr. D. Best thought that a contribution might be made from the Club funds, and, after some further discussion, it was decided, on the motion of Messrs. Keartland and Barnard, that Mrs. Bage's donation be accepted with thanks, also any other donations offered, and that such an amount be added as would make the total £5, to be handed to the fund as a donation from the Field Naturalists' Club of Victoria.

Reports of excursions to Sandringham and Fern-tree Gully were presented by the respective leaders. Details will appear in next *Naturalist.*

ELECTION OF MEMBERS.

On a ballot being taken, Mr. David Davis, Weston-street, Brunswick, and Mr. E. C. Joshua, Bruce-street, Toorak, were duly elected as ordinary members; Mr. C. A. Robinson, Lands Office, Bairnsdale, as a country member; and Miss G. Nethercote, Callantina-road, Glenferrie, Miss E. Hosking, 83 Park-street, St. Kilda, Miss G. Love, 12 Albert-street, Windsor, Master E. Jones, 181 Fitzroy-street, St. Kilda, Master L. Brettschneider, 82 Patterson-street, Middle Park, Master P. Prosser, 396 Richardson-street, Middle Park, and Master John Vial, Rathmines-road, Fairfield, as junior members of the Club.

GENERAL BUSINESS.

The chairman said the members were to be congratulated on the success of the recent conversazione and exhibition of wild

flowers. The financial result was not yet known, but it was anticipated that there would be a small credit balance. Mr. Barnard said he would like to move that a vote of thanks be accorded to Mr. J. Gabriel and Mr. C. J. Gabriel for their very valuable services in connection with the conversazione. The motion was seconded by Mr. A. D. Hardy, and carried unanimously. The chairman, in conveying the expression of the meeting to Mr. Gabriel, said that the resolution did not mean that others of the committee had not worked hard, but that the Messrs. Gabriel had undertaken the arduous part of the arrangement of the hall, on which the success of the meeting so much depended, and had done it well.

Mr. J. A. Leach, M.Sc., drew attention to "Bird Day," which would be celebrated in the schools on the following Friday, and invited the co-operation of any members willing to address the children of any of the metropolitan schools on that day.

PAPERS READ.

1. By Mr. E. B. Nicholls, entitled "A Trip up the Bass Valley."

The author recounted the experiences of a four-days' outing in the Bass Valley last Easter, for which he made Nyora his headquarters. The district was found to have been almost denuded of large timber, but a fair number of birds was seen, and some interesting observations on the powers of mimicry possessed by Lyre-birds were made in a patch of scrub at the head of the valley towards Poowong. He also mentioned that he believed examples of the rare Leadbeater's Phalanger had been destroyed at recent dates by timber-getters in the district, and that the Mutton-bird rookery at Cape Woolamai, Phillip Island, was in danger of destruction owing to the visits of "week-enders" from Wonthaggi, &c.

Mr. J. Gabriel said he feared the rare marsupial referred to by the author was now extinct. He had offered handsome rewards for specimens without response. Mr. G. Coghill complimented the author on his observations about the Lyre-birds, and said that he had noted the presence of Lyre-birds in the country back from Benalla. The chairman deplored the clearing of the Gippsland country, and Mr. A. H. E. Mattingley, C.M.Z.S., said the Lyre-bird must be considered the premier mimic among the birds of the world.

2. By Mr. F. G. A. Barnard, entitled "In the Western Lake District."

The author said that, up to the present, no notes about the Colac and Camperdown districts had been given before the Club, and, though perhaps the botany and entomology of the district were somewhat uninteresting, the geology and physi-

ography were well worth investigating, while the scenery is in many respects unique. His trip, taken at Easter, embraced visits to Colac and its lake; the Warrion Hills; Terang; the wonder lakes of the west, Gnotuk and Bullen-Merri; and, lastly, the Stony Rises, the peculiar charm of which it was hard to convey to others.

Mr. J. A. Leach, M.Sc., said that an interesting feature of the district was the structure of the lava flows, which had cooled into cubical masses heaped on top of one another. Red Rock, near Alvie, somewhat resembled Tower Hill, at Koroit, and afforded one of the finest views in Victoria.

Dr. T. S. Hall, M.A., said it was difficult to describe the Stony Rises, and advised members to take advantage of any opportunity to visit the district. In many places the ridges of stone were so steep that they were utilized as fences, and were quite stock-proof. He also stated that, though Lake Corangamite is salt, in parts the influx of fresh water was sufficient to enable the little mountain trout, Galaxias, sp., to live at some distance from the shore.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering branches of *Pomaderris elachophylla*, F. v. M., from Plenty Ranges; *Styphelia ericoides*, from Kinglake; also lichens, basalt, and marine limestone, in illustration of paper.

By Mr. F. Chapman, A.L.S.—Microscopic mount (in balsam) of a washing of clay forming a thin bed in Janjukian strata at Zeally Bay, Torquay, Vic., consisting almost entirely of the tests of Foraminifera and the valves of Ostracoda, the following genera being represented:—Bolivina, Lagena, Nodosaria, Marginulina, Cristellaria, Polymorphina, Sagraina, Globigerina, Planorbulina, Discorbina, Truncatulina, Anomalina, Nonionina, Cythera, and Loxoconcha. A species of Bolivina shows in an interesting manner the replacement of the sarcode by Glauconite (a hydrous silicate of potash and ferrous oxide).

By Mr. C. French, jun.—Flowers of *Pultenæa Weindorferi*, Reader, from Dandenong Ranges (new locality).

By Mr. J. C. Goudie.—Beetles from the Mallee—eight species of Carabidæ—*Carenum interruptum*, Macl.; *C. imitator*, Sloane; *C. elegans*, Macl.; *Neocarenum elongatum*, Macl.; *Carenidium superbum*, Cast.; *Euryscaphus dilatatus*, Macl.; *Scaraphites lenæus*, West. (new for Victoria); and *Parroa apicalis*, Sl.

By Mr. E. H. Lees, C.E. — Coral, *Flabellum australe* (?), dredged in Bass Strait from 60 fathoms.

By Mr. A. H. E. Mattingley, C.M.Z.S. — Photographs of Rufous Bristle-bird, *Sphenura broadbenti*, M'Coy, taken at Lorne (nest placed in wire-grass).

By Mr. A. L. Scott. — Dacite from Ferntree Gully, with basalt for comparison.

By Mr. P. R. H. St. John. — Flower-spike of Victorian Waratah, *Telopea oreades*, F. v. M., from Bell-bird Creek, East Gippsland; dried specimens of *Eucalyptus camphora*, R. T. Baker, from Sutherland's Creek, south of Brisbane Ranges; *Aster pannosus*, F. v. M. (*Olearia pannosa*, Hook.), south end of Brisbane Ranges, not previously recorded as collected within 50 miles of Melbourne; *Pomaderris ferruginea*, Sieber, south end of Brisbane Ranges, not previously recorded for the south of Victoria; *Bossiæa microphylla*, Smith, eastern slope of Brisbane Ranges, not previously recorded for south of Victoria; *Casuarina luehmanni*, R. T. Baker, between Brisbane Ranges and Parwan, not previously recorded for south of Victoria. These plants were collected in company with Mr. J. G. O'Donoghue during a two-days' walk through the Brisbane Ranges, 16th and 17th September, 1911. *Gladiolus grandis*, Thunberg (N.O. Irideæ), South Africa—a garden escape not previously recorded for Victoria, collected at Eltham, 30th September, 1911. Each of these specimens and records has been verified at the National Herbarium.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB CONVERSAZIONE.

The seventeenth conversazione of the Field Naturalists' Club of Victoria was held at the Masonic Hall, Collins-street, Melbourne, on Tuesday and Wednesday, 26th and 27th September, 1911.

The president, Mr. F. Wisewould, in declaring the conversazione open, said that the Club was now in its thirty-second year, which in itself was some guarantee of its usefulness. He claimed that it was greatly through its influence that nature study had become such a marked feature in our school courses, and that the great efficiency of many of the teachers was due to the opportunities and advantages offered by the Club. That the Club had some standing was evidenced by the fact that questions relating to the provisions of the *Game Act* were frequently submitted to it by the authorities. The Club had ever been foremost in advocating and helping to secure the preservation of the indigenous fauna and flora. For twenty-seven years it had maintained at considerable expense a magazine, which was sought for all over the world, and which contained most valuable records relating to the natural history of Victoria. He desired to thank those members of the Bird Observers' Club and the Microscopical Society who were helping to contribute to the entertainment of the visitors, whom

he trusted would be interested in the various objects displayed, and that some of them at least would show their appreciation of the objects and aims of the Club by becoming members, and as members he could assure them a very hearty welcome.

Notwithstanding heavy showers on each evening, there was a very good attendance of the general public, while for the afternoon opening on Wednesday the attendance was considered a record.

Just three years had elapsed since the last conversazione, and it was gratifying to find that most of the former exhibitors were again represented by exhibits of various kinds, and that some new names appeared on the programme to fill the place of those who, from various reasons, were unable to contribute. The display of wild-flowers was a leading feature in the exhibition, and was by many considered the best which has yet been made. All parts of the State were represented, and, among others, the Club is greatly indebted to a number of teachers of country schools who were good enough to forward flowers from their respective districts. Several members had gone to considerable trouble in visiting distant localities likely to be productive of attractive results, and, owing to a favourable spring and good weather, their efforts were well rewarded.

As usual, those members who set themselves to display the wonders of nature by means of the microscope had a busy time in answering the numerous questions put to them, and in showing the various objects which they had brought for the instruction and amusement of the visitors.

A very fine display of Australian plants and cut flowers grown at the Melbourne Botanic Gardens was made by the director, Mr. J. Cronin, and contained some noteworthy specimens. Among the pot-plants were Cabbage-Palms, *Livistona australis* (with spikes of bloom attached), Queen Alexandra's Palm, *Archontophœnix Alexandræ*, and the Giant Fern-Palm, or Burrawong, *Macrozamia Perowskiana*. Growing specimens of twenty-seven species of Victorian ferns, including fine plants of the Slender Tree-Fern, *Cyathea Cunninghami*, Black Tree-Fern, *C. medullaris*, King Fern, *Todea barbara*, Prickly Tree-Fern, *Alsophila australis*, and Common Tree-Fern, *Dicksonia antarctica*. The collection of cut flowers numbered about forty species, among which were the Waratah, *Telopea speciosissima* (N.S.W.), Rock-lily Orchid, *Dendrobium speciosum* (N.S.W.), *Clematis aristata*, var. *Dennisæ* (Vict.), *Bauera rubioides*, var. *alba* (Vict.), *Chorizema cordatum* (W.A.), *Anigozanthus Manglesii* (W.A.), and *Epacris longiflora* (N.S.W.)

On Tuesday evening a lecturette, entitled "The Birds of Australia," illustrated by lantern views, was given by Mr. J. A. Leach, M.Sc., who called attention to the many dis-

tinctive characters in the bird-life of Australia, which, he said, is in many ways more interesting than that of any other quarter of the globe, and remarked that, while only two widely-distributed families of birds are missing in its list, there are several which do not extend beyond its boundaries. While Europe has but one family of birds restricted to it, the Australian region has no less than eighteen families of birds peculiar to it. It is the stronghold of such groups as the honey-eaters, the mound-builders, the parrots and cockatoos, the bower-birds, the birds-of-paradise, and the bell-magpies. That its birds are songless is quite a mistake, for, as songsters, many of its birds compare more than favourably with those of other countries, while in the Lyre-bird it possesses the finest ornithological mimic known. The song-birds are more varied than those of any other region, for Australia has members of twenty-nine families of song-birds, while North America has but twenty-three and Britain nineteen families. Many British birds are much more strongly represented in Australia than in Britain, for, while the latter has but one kingfisher, one cuckoo, one tree-creeper, and one nuthatch, Australia has respectively fourteen, fourteen, eight, and eight members of these groups. Again, Australia has two of the six families that make up the primitive sub-class of birds ; these are the Emu and Cassowary. This sub-class is not represented at all in northern lands. Southern lands are much richer in bird-life than northern lands, so that, while Australia has eighty families of birds, Europe, Western Asia, and North-west Africa together have but seventy-three, while North America, excluding Mexico, has but sixty-nine families of birds. Too long have Australian birds been belittled. The Australian eagle is the largest eagle known ; the Kookaburra is the giant of the kingfisher family ; while Alfred Russel Wallace said " the wonderful modulated whistle of the Australian magpie is unequalled among European birds."

By way of further illustrating the lecturette, the series of diagrams used to illustrate the recently published volume, " An Australian Bird Book," was kindly lent by the Education Department ; and Mr. L. E. Chandler, of the Bird Observers' Club, assisted Mr. G. A. Keartland to make up a representative series of bird skins, numbering about ninety specimens, illustrating every family of the birds of Victoria.

The lecturette on Wednesday evening was given by Professor E. W. Skeats, D.Sc., who took as his subject " Geology in Relation to Scenery," and, by means of a fine series of lantern slides, pointed out to an appreciative audience the characteristics of the principal land forms, such as mountains, plains, lakes, rivers, valleys, &c. He then referred to the structural

features of rocks, such as bedding planes, joint planes, folding, &c., and showed by a series of slides how the forces of erosion are concentrated along these planes of weakness, and largely determine the details of land forms developed under erosion. In this way the characteristic sculpturing of sedimentary and of igneous rocks was illustrated, and it was shown that the sea, running water, wind blast, and chemical erosion each develop distinct types of weathering. The effect of moving ice as an agent of transport, deposition, and erosion was discussed and illustrated by views of districts now or formerly glaciated. In conclusion, some reference was made to the effect of the scenery of England on its literature.

EXHIBITS.

The following is a list of the exhibitors, with particulars of their exhibits as furnished by them :—

Baker, H. H., Melbourne—Microscopes by Watson and Sons, showing selected slides of various objects.

Barnard, F. G. A., Kew—Case of Australian Bird Skins, including Regent-bird (male and female), King Lory, Green-Leek Parrot, Cat-bird, Great Fruit-Pigeon, &c. Growing Victorian Plants :—Austral Beech, *Fagus Cunninghami*; Sassafras, *Atherosperma moschatum*; Orchids in bloom—*Sarcochilus parviflorus* (epiphytal), and *Caladenia Patersoni*, Spider Orchid; Ferns—*Botrychium ternatum*, *Lomaria alpina*, and *Asplenium flaccidum*, &c.

Cochrane, Miss S. W., Hawthorn—Paintings of Victorian Orchids and Wild-flowers.

Department of Agriculture, Entomological Branch—Cabinet drawers of Life-Histories of Insects, &c.; case of Insectivorous Birds (over 100 species); coloured plates from recent publications.

Dunn, E. J., F.G.S., Kew—Recently-published volume, "Pebbles"; series of stones showing the formation of a pebble.

Education Department, Melbourne—Coloured plates, blocks, &c., of Australian Birds.

Ewart, Prof. A. J., University—Enlarged models of Flowers, Leaves, Seeds, Roots, &c., used for teaching purposes; sections of Fossil Plants (for microscope).

Gabriel, C. J., Abbotsford—Twenty cabinet drawers of Marine Shells—Cypræa, Trivia, Chlamys, Pecten, Spondylus (20 species), and Zenophora (10 species); largest and smallest Victorian univalves—*Voluta mammilla*, Gray, and *Cyclostemma Bastowi*, Gatliff; case containing genera of family Gastrochænidæ *in situ*.

Hall, Dr. T. S., M.A., Camberwell—Fossil Echinoids from Older Tertiary of South Australia; Photographs of Graptolites from Upper and Lower Ordovician, Victoria.

Hamilton, J. T., F.L.S., Ivanhoe—Aboriginal Weapons and Specimens of Native Workmanship, String Bags, &c.; Stone Tomahawks, showing various stages in production.

Hardy, A. D., F.L.S., Kew—Skin of Dingo, from Wilson's Promontory; Vegetable Caterpillar, from Otway Forest.

Harvey, J. H., A.R.I.V.A., East Melbourne—Cabinet Stereoscopes, with views of Buchan Caves, &c.

Horner, H. E., Toorak—Quartz Crystals, &c.

Keartland, G. A., Preston—Australian Bird Skins.

Keble, R. A., Camberwell—Fossils, &c.

Kershaw, J. A., F.E.S., Windsor—Twelve cabinet drawers of Australian Lepidoptera ; two cases of Australian Bird Skins.
Kitson, J. S., Continuation School, Melbourne—Collection of Rocks, Minerals, &c., from Clifton Hill Quarry.
Nicholls, E. B., North Melbourne — Teeth of Australian Mammals, Fish, &c.
Roger, W. H. A., Armadale—Case of House-building Moths, showing life-histories.
Rosenhain, O. W., St. Kilda—Three cases Australian Birds (mounted), including the rare Ground Parrakeet, Stormy Petrel, &c.
Scott, A. L., Toorak—Pebbles, &c.
Searle, J., Carlton — Novel Form of Aquarium, with Fresh-water Crustaceans, &c.
Skeats, Prof. E. W., D.Sc., University—Rock-section Cutting Machine at work ; case of rare Minerals ; Geological Models, &c.
Spry, F. S., South Melbourne—Four cases of Australian Lepidoptera.
Whitcombe and Tombs Ltd., Melbourne—Australian Natural History Publications.
Wisewould, F., Elsternwick—Victorian Snakes (in spirits).

Wild-Flowers.

The following were the principal exhibitors, with some of the more notable species shown, grouped by their localities into the districts of the " Key to the System of Victorian Plants " :—

North-West.

By Mr. St. Eloy D'Alton—About 50 species from Dimboola, including *Acacia trinerva, A. farinosa, A. rigens, Prostanthera chlorantha, Eriostemon difformis, E. sediflorus, E. stenophyllus, Eucalyptus unciata, Dampiera rosmarinifolium,* &c.

By Mr. J. C. Goudie — About 25 species from Sea Lake, including *Cryptandra subochreata, Prostanthera coccinea, Loudonia Behrii, Boronia cærulescens, Acacia Sentis,* &c.

By Mr. E. Pearce—Bunch of *Swainsona procumbens,* from Jeparit.

By Head-master, State School, Berriwillock (near Sea Lake)—About 25 species, including *Cassia eremophila, C. australis, Prostanthera chlorantha, Halgania cyanea, H. lavandulacea, Lavatera plebeja, Aster Muelleri, Loudonia Behrii, Acacia brachybotrya, Westringia rigida,* &c.

By Head-master, State School, Lascelles (Mildura line)—About 15 species, including *Westringia rigida, Prostanthera coccinea, Acacia Sentis, Halgania cyanea, Dampiera marifolia, Lasiopetalum Behrii,* &c.

South-West.

By Mr. A. G. Campbell—About 40 species from Pomonal (Grampians), including *Styphelia Sonderi, Dillwynia hispida, Prostanthera denticulata, Boronia pilosa, B. pinnata* (two varieties), *Templetonia sulcata, Correa æmula, Acacia retinodes,* &c.

By Mr. G. E. F. Hill—About 25 species (some cultivated) from Mooney's Gap, near Ararat, including *Grevillea aquifolium, G. lavandulacea, Stypandra glauca, Thryptomene Mitchelliana, Correa speciosa,* also pink variety, &c.

By Mr. C. Overman—About 40 varieties from Dunkeld, including *Correa speciosa* (red variety), *Boronia pilosa, Grevillea oleoides, Conospermum Mitchelli, Pultenæa canaliculata, Lhotzkya genetylloides, Astrotricha ledifolia,* &c.

By Mrs. Wettenhall — 9 species (cultivated) from Glen Holford, Pomonal, including *Grevillea oleoides, G. ilicifolia, Prostanthera rotundifolia, Lhotzkya genetylloides, Thryptomene Mitchelliana, Calycothrix Sullivani, Lasiopetalum dasyphyllum, Marianthus bignoniaceus.*

South.

By Mr. J. W. Audas — About 60 species from Beaconsfield and Cockatoo, including *Acacia diffusa, A. juniperina, Bœckea diffusa, Styphelia ericoides, Epacris obtusifolia, Plagianthus pulchellus, Chiloglottis Gunnii, Tecoma australis*, var. *Latrobei*, &c.

By Miss Cochrane—About 60 species from Healesville, including *Hakea nodosa, Pterostylis pedunculata, P. curta, P. longifolia*, &c.

By Mr. A. Hocking — About 12 species from Ringwood, including *Caladenia suaveolens, Tetratheca ciliata* (fine), &c.

By Mr. R. Kelly—About 90 species from Healesville, including *Drimys aromatica, Coprosma Billardieri, Pittosporum bicolor, Pomaderris vaccinifolia, Plagianthus pulchellus, Grevillea alpina, Chiloglottis Gunnii.*

By Mr. J. P. M'Lennan—About 30 species from Ferntree Gully, including *Acacia leprosa, Goodia lotifolia, Indigofera australis*, &c.

By Mrs. E. B. Nicholls—About 12 species from Black Rock, including *Diuris maculata*, &c.

By Messrs. F. Pitcher, P. R. H. St. John, and J. Gabriel—About 60 species from Frankston, including *Acacia armata, A. verticillata, Aotus villosa, Comesperma ericinum, C. volubile, Isopogon ceratophyllus, Melaleuca squarrosa, Pimelea humilis, Sprengelia incarnata*, &c.

By Miss Rollo—About 20 species collected by children of Wonga Park State School, near Ringwood, including *Epacris impressa, Tetratheca ciliata*, &c.

By Dr. Sutton and Mr. F. G. A. Barnard — About 50 species from Brisbane Ranges, near Bacchus Marsh, including *Acacia aspera, A. tenuifolia, Pultenæa daphnoides, Bossiæa microphylla* (new record for S.), *Boronia polygalifolia*, var. *anemonifolia, Grevillea aquifolium, Prostanthera hirtula, Aster teretifolia, A. pimeleoides*, &c.

By Mr. E. F. Thiele — About 50 species from Doncaster, including *Kennedya prostrata, Thelymitra antennifera, Pterostylis curta, P. pedunculata*, &c., all in very good condition.

By Mr. J. R. Tovey—About 25 species from Mentone, including *Aotus villosa, Hibbertia fasciculata, Glossodia major, Thelymitra antennifera*, &c.

By Mr. J. Vial.—About 12 species from Oakleigh, including *Ricinocarpus pinifolius*, &c.

By Mr. H. B. Williamson—About 12 species from Linton, including *Pultenæa Gunnii, Acacia Whanii*, &c.

By Messrs. F. Wisewould and G. Coghill—About 50 species from South Gembrook, including *Banksia collina, Dampiera stricta, Sprengelia incarnata, Epacris microphylla, Sphærolobium vimineum*, &c.

By Head-master, State School, Grantville—About 30 species, including *Pultenæa daphnoides, Styphelia richea*, &c.

North Central.

By Mr. C. H. Derrick—About 20 species from Campbell's Creek, near Castlemaine, including *Grevillea rosmarinifolia, G. alpina, Tetratheca ciliata* (fine), *Swainsona procumbens, S. lessertifolia, Eriostemon obovalis*, &c.

By Mr. H. Dettman — About 20 species from Kyneton, including *Acacia pycnantha, Tetratheca ciliata*, &c.

By Master Marshall — About 10 species from Chewton, including *Eriostemon obovalis, Grevillea rosmarinifolia*, &c.

By Mr. F. Rich—About 30 species from Rushworth.

North-East.

By Mr. T. Godden—About 25 species from Balmattum, near Violet Town, including *Dillwynia floribunda, Podolepis acuminata*, &c.

By Master R. Goodyear — About 30 species from Beechworth, including *Diuris maculata, Pterostylis nutans, Thryptomene ericæa, Stypandra glauca*, &c.

By Dr. J. R. Thomson—About 35 species from Violet Town, including

Pultenæa humilis, Eriostemon obovalis, Diuris punctata, Swainsona procumbens, Utricularia dichotoma, &c.

East.

By Mr. A. W. Crow—About 25 species from Moe, including *Pomaderris elliptica, Boronia pinnata* (pink and white, fine).

By Mr. C. Daley—About 30 species from Sale, including *Plagianthus pulchellus, Banksia serrata* (fruit), *Helichrysum obtusifolium,* &c.

By Mr. W. Moncur — About 12 species from Ten-Mile Creek, near Narracan, including *Pimelea axiflora, Clematis aristata, Tecoma australis* (fine), &c.

By Mr. E. H. Small—About 10 species from Coalville (Moe), including *Tecoma australis,* &c.

By Mr. F. Thomas—About 20 species from Lindenow, near Bairnsdale, including *Stypandra glauca, Hibbertia obtusifolia, Diuris sulphurea,* &c.

Cultivated Australian Flowers.

By Mr. A. Rutter Clarke, Toorak.—About 30 species, including *Kennedya rubicunda, K. nigricans, Boronia pinnata, B. alata, Prostanthera Sieberi, Chamælaucium uncinata,* &c.

By Mr. H. Anderson, Tooronga.— About 12 species, including *Grevillea alpina, Acacia linifolia,* &c.

Microscopical Section.

Microscopical exhibits were made by members and friends as under :—

Mr. F. H. Baker—Polyzoa, Diatoms, and Radula.

Mr. F. Chapman, A.L.S., F.R.M.S.—Spore Coal (Tasmanite), from Railton, Tasmania ; Foraminifera and Ostracoda, dredged up round Funafuti from a depth of 3 miles ; Antarctic Foraminifera.

Mr. J. Gabriel—Circulation of blood in Tadpole.

Mr. J. T. Hamilton, F.L.S.—Botanical and Rock Sections, Polyzoa.

Dr. J. C. Kaufmann—Parasites and Crystals.

Mr. W. M'Intosh—Botanical Sections.

Mr. J. Searle—Freshwater Entomostraca—*Brunella virides,* Bœckella (three species), Cyclops (four species); *Daphnia carinata,* with *Brachionus,* sp., attached.

Mr. A. L. Scott—Rock Sections.

Messrs. W. and J. Stickland—Ostracoda ; Vorticella.

University Biological Department (Miss Davies and Miss J. Raff, M.Sc.)—Section Cutting.

University Botanical Department (Mr. J. D. Jennings)—Carbon Assimilation by Leaves.

University Geological Department (Messrs. F. Stillwell and M. Morris)—Rock Sections and Rock-sectioning Apparatus.

Veteran Naturalists. — On 30th June last Sir Joseph Hooker, the famous botanist (abbreviated as Hook *fils*) celebrated his 94th birthday. He is known to Australians as the botanist to the South Polar expedition under Sir James Ross in the *Erebus* and *Terror* over 70 years ago, and as the author of two standard volumes on the botany of Tasmania and New Zealand. At the meeting of the Quekett Microscopical Club (London) on 27th June a vote of thanks was passed to Dr. M. C. Cooke, now in his 87th year, for a valuable gift of Foraminifera and diatomaceous earth. Dr. Cooke is well known as the author of many works dealing with fungi, freshwater algæ, microscopy, &c.

A COLLECTING TRIP TO THE HERBERTON DISTRICT, NORTH QUEENSLAND.

By F. P. Dodd, Kuranda.

(*Read before the Field Naturalists' Club of Victoria, 14th August,* 1911.)

For several years I had desired to undertake a collecting trip to the Herberton district and the great Evelyn Scrub, but the difficulties and inconveniences of travelling by coach, or other vehicle, over part of the way, with my necessarily large number of boxes and entomological requisites, prevented the carrying out of my desire. However, in January, 1910, I sent my son, who has been assisting me in the field for several years, to examine the country and report upon its possibilities, in consequence of which, and the recent completion of the railway to Herberton, I determined to spend several months in the vicinity of the scrub, some 12 miles south from Herberton. Accordingly, late in November last I left Kuranda, fully prepared for the work, my son preceding me by several weeks.

From Kuranda the line runs south-westerly for about 20 miles, and then turns due south, Atherton (2,466 feet) being reached at 47 miles from Kuranda. The line continues south for several miles further before the foot of the Herberton Range is reached. As the train ascends the granite hills, a pretty view opens out across a wide and deep valley to the right, some of the hills opposite being densely clothed with scrub. At the bottom of the valley the old coach road may be perceived. The hills, up which the train slowly climbs, are fairly thickly covered with tall forest trees, generally Stringy and Iron-barks, Bloodwood, and Scented Gum, *Eucalyptus citriodora*. A cascade waterfall, known as the Carrington Falls, is passed close by the line on the left, one tunnel is negotiated, and soon after we are on top of the range, perhaps not quite 4,000 feet anywhere, then a downward run of a few miles brings us to Herberton (2,800 feet), 13 miles from Atherton. The township is spread along the slopes of the hills, with the here unimposing Wild River cutting it in two, the greater and business portion being on the eastern side. The river, a little further down, after junctioning with several important watercourses, becomes the Herbert, which drains all the country about here. A mile or two westward across the hills the waters run to tributaries of the great Mitchell River, flowing to the Gulf of Carpentaria, which must become a mighty stream during the phenomenal rainfalls of the North Queensland wet season.

I had left Kuranda at 9 a.m., and arrived at Herberton at 1.40. The day was hot, but pleasant to a dweller of the lower districts. Though wearing a warm tweed suit, I experienced

not the least discomfort. Often, when hearing Herberton or Evelyn residents complain of the heat, I would wonder how they would relish living in Cairns or Townsville, if suddenly transported there. One can quickly get used to any warm climate if much out of doors. I dwelt for years at Townsville, and preferred the summer to the cool season; the same at Kuranda, where I have resided for the past seven years, less a year at Port Darwin.

About 4 o'clock in the afternoon I started for the Evelyn Scrub in a buggy drawn by two smart ponies, driven by Mrs. Hull, who has a knowledge of horses and driving any man could well be proud of. After passing along and down a ridge, we crossed Nigger Creek, two miles out, over which the railway passes on its way to the scrub lands, but is not yet open for traffic. Beyond, for several miles, the large and tall trees showed we were passing through good agricultural country. Leaving this, we commenced to ascend a range of hills—avoided by the railway—one of which, with a precipitous face, is known as "The Bluff," and is discernible for some distance. In places mountain vegetation became apparent, such as stunted trees of Bloodwood, Ironbark, fibrous-barked Casuarina, Tea-tree (not Melaleuca), and heathy shrubs, a dwarf Acacia, leguminous and other plants, and a few flowers. In some places *Tristania conferta* becomes a shrub, and forms almost impenetrable thickets, acres in extent. Some of the flowering shrubs, such as Hovea, I have seen near Brisbane; others, again, in the vicinity of Stawell, Victoria, taking me back to days of long ago—rabbit-hunting, cranberry-picking, and wild-flower gathering. The love of natural history had not taken strong hold of me in those early days (though I knew the bush and the birds well), which I regret, for the Stawell district is both pretty and interesting, with great variety of trees and shrubs, and doubtless producing many species of insects.

The highest point our road passed over was scarcely 3,600 feet, the "Bluff" probably being 250 feet higher. We took measurements by aneroid later of road and other hills, but not of "The Bluff." Descending the hills, and crossing Mill Creek, which possesses several fair waterfalls, and is the same upon which Mrs. Hull lives higher up, our road for over a mile took an easterly trend to her selection, known as "Cressbrook," still close to the hills, where I had arranged to stay, the scrubs being adjacent. Another road from Herberton runs much more to the left, until it touches the scrub, finally junctioning with the southern one I had travelled by, and, entering the scrub, becomes the Geraldton road, which, lower down the range, can only be negotiated on foot. For the last mile or so of

our journey the country was well timbered with tall White Gums, *Eucalyptus tereticornis*, Bloodwoods, *E. corymbosa*, and two species of Casuarina, one having long, slender, drooping branches. This and the small mountain species was new to me.

"Cressbrook" is a dairy, worked by Mrs. Hull and several grown-up daughters—young women stout and strong, equally at home in the saddle or house, and quite unconcerned if out in pelting rain all day long. Mill Creek, which runs close to the house, is an ever-flowing and watercress-fringed stream of cool and pure water—except in times of heavy rain. Here my son and I spent three very busy months. To be exact, our location was about forty-five miles due west of Mourilyan Harbour, but with many impenetrable ranges between.

All new localities have an extraordinary charm for the naturalist. At first, as the many new species came to light, our interest was unbounded; but as time wore on, and nothing unusually remarkable was discovered, we experienced a slight feeling of disappointment. Were it not that we collected specimens of most of the orders, more particularly of Lepidoptera, our trip would have been a somewhat unsatisfactory one. However, we specially desired Micro-lepidoptera, and of these were successful in making a very fine collection. Perhaps I had better refer to each order separately, touching briefly upon the larger or more curious species collected or noted.

When I arrived the country was brown and dry, the coastal rains of the early summer not having extended to the district, though several drizzly periods had kept the scrub damp. These drizzles favour the growth of moss on nearly all the scrub trees: even on quite small ones great bunches of moss, a foot in length, or as large as a dinner plate, may often be seen hanging on twigs no thicker than a lead pencil. One of these bunches, 15 inches by 10, I brought away with me.

Thunderstorms had floated past us on both sides for some time—the direction generally from the west—until we were favoured with a good shower; then, early in January, our first continuous rain, of three or four days, set in, and a little later it was too frequent to be pleasant. The thunderstorms here are more dangerous than near the coast (or at Port Darwin, where they are of almost daily occurrence for four months, and frequently are extremely violent), and we often heard of trees that had been struck by lightning. My son came across one where the lightning, after tearing off a topmost branch, ran down the trunk, causing a groove half an inch deep and a little wider, and stripping away the bark on each side of the groove, the strip of bark removed having a regular width

of about 7 inches all the way down. This tree died. We brought away a section showing the electric track through the bark and wood, and another from a larger tree with a wider lightning groove in the wood, the tree having been killed at least a year before. Mrs. Hull and daughters told me of a hollow tree near Evelyn cattle station, a few miles away, where lightning had entered above and burst splintery holes through the trunk in several places. Close by Mr. Stone's residence, in the scrub, a large tree was shattered by lightning, which continued along a large horizontal root, tearing a trench in the ground for some yards.

The climate is a mild, pleasant, and extremely healthy one —maybe at times too chilly for some, for in winter the temperature is often much below freezing-point, and frost and ice are common. Ice has no attractions for a coastal man—unless in a summer drink.

Nearly all the fruits, vegetables, and flowers of the south thrive in the district. Anywhere peaches and dahlias do splendidly. An old, neglected orchard at "Cressbrook" contained fairly well-laden apple, peach, plum, and pear trees: strawberries and grapes also take kindly to the district. In the flower garden there were petunias, marigolds, violets, dahlias, stocks, honeysuckle, &c. Citrus trees, too, were present, but the winter is, at times, somewhat severe for them. In the scrub at Mr. Stone's residence, a pale heliotrope plant deserves notice: it was fastened on to the side of the house, and was about 11 feet high, and as wide, with a depth of about 3 feet. It was loaded with blossoms, and doubtless could have been trained much higher; but, reaching the spouting, it was kept clipped there.

Always living in the coastal districts, I have never seen a plague of caterpillars, but I was informed of one which occurred in the district a few years ago. The insects came along in a rolling, tumbling mass, and could distinctly be heard advancing. Everything green was attacked. The creatures swarmed into and crawled over the house, fell into and polluted the water in tanks and creek, climbed up the legs of fowls, cows, and other animals, and they and human beings too were depressed and sick for several days from the pollution of the water and a most unpleasant odour that arose from the myriads of crawling things. Strange to say, as has before been noticed in cases such as this, no extraordinary number of moths followed the caterpillar visitation.

In and adjacent to the scrub, the largest and highest trees I have yet seen in Queensland came under my notice. Gigantic White Gums fringe the scrub, and continue a little way along the watercourses which start from it; mighty Kauri Pines,

Damara australis, perhaps 8 feet through and 120 feet high, are plentiful in the scrub; but, not having actually measured them, I must be careful, for, not long ago, wonderful stories were told and published about North Queensland and its scrubs, its wild blacks, fearful storms, wonderful birds, &c.

These notes are absolute facts, and I have no desire to pose as a hero, or marvellous climber, and discoverer of what does not exist. For instance, the remarkable Tooth-billed Bower-bird, which is rarely found below 1,500 feet, has been recorded as an eater of snails, cracking the shells on a stone regularly visited for the purpose. Along with Mr. Sharpe and others, I have examined hundreds of play-grounds of this bird, and have failed to find a shell, or even a fragment, on or near any of them. Nor have we found a stone, or log, or anything else with signs of shells having been cracked thereon. A person may travel through the scrubs, particularly the higher ones, for a whole day at any season of the year and not see a single live snail, because they are by no means plentiful, and, again, they are strictly nocturnal, while the bird is not. Even if one of the birds differed so much from its kindred as to find the snails and crack them on a stone near its play-ground, it would not be likely to again differ and allow the fragments to remain scattered therein, as has been represented in a recent photograph. Neither does the Grey Bower-bird, *Chlamydodera orientalis*, ornament the inside of its bower with pieces of coloured glass. Those pieces which were reported to have been seen artistically arranged amongst the erect twigs had doubtless been placed there by the hands of the school children of the district, who often visited that particular bower, which was close to a township, and, in fact, occupied the site of a hotel of the earlier coaching days. Nor did we observe Cassowaries bumping the trees to shake down their fruits, or come across wondrous vines which covered many acres of scrub, nor even one which covered one acre. Such a vine would be a wonder; but one covering many acres would truly be the marvel of the vegetable kingdom. Those, therefore, who look for marvels in these notes will be disappointed. It is regrettable that the truth is often commonplace and dull, and it seems that there are several persons writing on Australian natural history matters who recognize this, and are enterprising enough to have set themselves to rectify such a state of things. The same writer recorded fearful storms in the Atherton district towards the end of 1908, which produced sudden and alarming floods in the Barron River; but the remarkable feature of the record is that only this one person seems to have seen the havoc wrought by these dreadful storms or the terrible floods. He states that great trees were snapped off in a wholesale manner. My experience of several

cyclones is that the trees are generally torn up by the roots. Fortunately, Atherton was not in the track of these storms, or it would have been swept off the face of the earth. Curiously enough, the officially recorded rainfall for Atherton for October, November, and December, 1908, is 141 points on 10 wet days, 81 points on 7 wet days, and 81 points on 3 wet days respectively, or a total of 3 inches for 20 days' rain spread over three months. Even if the whole three inches had fallen in one day, unless preceded by much heavier rain to saturate the ground and fill up all low-lying places, it would not have affected the Barron to the extent of six inches. Further comment on such reports is needless.

Butterflies.—Lepidoptera being the principal objects of our search, I will deal with that group first. Butterflies were very disappointing. Within the scrub *Ornithoptera cassandra*, *Papilio joesa*, *Euschemon rafflesia*, *Cethosia cydippe*, and other handsome and well-known species occurred. I was greatly surprised at finding the last-named species at the altitude of 3,500 to 3,600 feet. The pretty and active *Pyrameis itea*, which I had not seen further north than Brisbane, was taken occasionally, both within and without the scrub. The new skipper, named by Lower *Hesperilla malindeva*, which my son took last year, proved to be both rare and local, and a dozen examples were all we could secure The blues (Lycænidæ) were all of common species, and not numerous. The taking of a male of *Hypolycæna phorbas* probably indicates that the Green Tree-Ant is in the scrubs here, though we did not notice it anywhere.

Moths.—Hawk-moths (Sphingidæ) generally were scarce; however, a freshly-emerged specimen of *Cequosa australasiæ* was picked off a twig. Several species of Zeuzeridæ, some of them found near Brisbane, were bred out. One of them proved to be new, and has been named *Xyleutes methychroa* by Dr. Turner. Several Hepialidæ were taken. *Hepialus daphrandræ* was as fine as those found near Brisbane. Along the northern coast it is generally small. The males of *H. cyanochlora*, which we had bred at Port Darwin and frequently in North Queensland, were the handsomest I had yet seen. The smaller species, *H. Lewinii*, which I had not previously met with in the north, was larger than usual. Several fine species of Darala and Teara were bred or captured, one fine Darala being rather handsome, and new to me; another, *Eupterode doddi*, Turner, varied in a remarkable degree, much more so than the widely distributed *D. acuta*. Some common "procession caterpillars," including *Teara contraria*, were in hundreds just before our departure. The pretty *T. variegata* was often taken at rest on the trunks of Casuarinas (its food plant), and young larvæ were noticed in numbers at the end of February. A handsome

new Xyloryctid was bred from the gummy bark of the Scented Gum, *Eucalyptus citriodora*. Micro-lepidoptera were in great force just before the wet weather set in, and I was able to make a fine collection of them.

That common but large and showy day-flying moth, *Nyctlemon orontes*, was in thousands in the hills, and was reported from several localities At the same time (January and February) it abounded in the Kuranda district, and almost every day since I came home it has been passing over in great numbers. I hope some day to prepare some notes on this interesting moth, which, by non-entomological observers, is generally spoken of as a butterfly. The great flights of butterflies frequently recorded in North Queensland are merely every-day flights of this moth. The following paragraph appeared in the *Cairns Post* of 5th June :—" Picnickers to Second Beach yesterday witnessed a rather pretty sight in the shape of a thick flock of butterflies, which settled on the vegetation along the banks of the creek which runs towards the Gorge. The place was thick with butterflies, which remained there all day. These have been seen in the locality on previous occasions, but never in such numbers as witnessed yesterday." The so-called butterflies were all specimens of *Nyctlemon orontes*. A somewhat similar paragraph was published in April, just after the great rains, but it has been mislaid.

At this time we had just experienced the five days' rain which had had such disastrous effects upon the Cairns railway (Kuranda recorded 85 inches for the five days). After the deluge butterflies were conspicuous by their absence ; not so *N. orontes*. It was passing over as freely as ever, doubtless coming from a locality beyond the influence of the cyclone, and the accompanying phenomenal rainfall.

Remarkable butterflies do not occur in great numbers anywhere in the north, and especially in the Atherton district, notwithstanding the report of a southern egg-collector that they were of extraordinary brilliance, and occurred in vast numbers. They cannot compare in numbers with those of an ordinary coastal district in tropical Queensland. No fine species occur there that are not represented on the coast, and the butterflies he saw passing over one day were merely flights of the Nyctlemon. Lepidopterists should know this, and oologists should know that nests and eggs are no more plentiful or more difficult to find there than in any other tropical scrub.

Coleoptera.—Beetles were by no means plentiful in scrub or forest. Of course, we secured some fine species, but at the expense of much wandering, searching, and a little climbing. What few flowering trees there were were too tall, thin, or straggling to be profitably climbed and worked, and one of

the best beetle trees in the north, the Bloodwood, *Eucalyptus corymbosa*, flowered too late. The magnificent *Phalacrognathus Muelleri*, the pretty *Neolamprima mandibularis*, and the several fine Buprestids and Cetonids we obtained were well worth the hunting and scrambling for. Longicorns were disappointing. A fine streaked Elater and a fair number of Tenebrionidæ were taken, a dozen or so of the latter being strangers to Mr. Carter, who is so interested in this family. Other novelties included a small coppery Carenum, a handsome Pamborus, three Amycteridæ, various Carabidæ, &c.

Odonata. — Among dragon-flies, a superb specimen of *Petalura gigantea*, the only one seen, and two examples of a large species with brown shaded wings, which Mr. Tillyard informs me is "*Planæschna costalis*, a fine and rare insect," were taken. We sent him about nine or ten species, all of which he states "occur around Sydney, and right down into Victoria, and even Tasmania."

Rhynchota. — Cicadas, leaf-hoppers, and bugs were but poorly represented, nor was anything remarkable noted in any group or family.

Diptera.—Flies were in great variety, many being large and handsome. A gigantic Asilid, black, with yellow body, which occurs in the Brisbane district, was captured. At flowering shrubs we took both curious and handsome species, and at over-ripe fruit a short, stalk-eyed species (*Zygotrichia*, sp. ?) was netted. At Kuranda there are three species of these queer flies, odd examples of one species having eyes three-fourths of an inch apart.

Orthoptera.—Mantids, locusts, crickets, and cockroaches were few in species and numbers, and of quite ordinary appearance. One of the Locustidæ calls for special mention—perhaps a different species from the southern *Acridopeza reticulata*, for the male is black and the female has not the blue, white, and red tints of this species on her body, but blue and orange. A pink-winged Phasma was taken now and then, and several other medium-sized species were observed. A grey insect, flattened underneath, and splendidly hidden on rough-barked trees, was the best we saw. Two slender, wingless species, one in the scrub and the other in the grass of the forest, were occasionally met with.

Hymenoptera.—Wasps and bees were rather scarce, and so were conspicuous Ichneumonidæ, but we took examples of one fine species, a Megalyra, with ovipositor over two inches in length. The ants, too, were fewer in species than nearer the coast. The absence of the Green Tree-Ant, *Œcophylla virescens*, the Mound Ant, *Iridomyrmex purpurea*, and other well-known species was at once noticeable. There was a fine reddish

"bulldog," with black abdomen, and a "jumper," both of the genus Myrmecia. That wretched little pest, the Brown House-Ant, so common in Queensland, which infests our gardens and houses, and is such a protector and undoubtedly farmer of scales and aphides, was happily absent—at least, wherever we were—but, like the sparrow, it is bound to spread.

Birds.—My son is interested in these, but I gave him little time to observe or collect same. He obtained less than a dozen skins, and found a few clutches of eggs, most of which he did not interfere with. Nests found included Satin Bower-bird, *Ptilonorhynchus violaceus*, containing one egg (height from ground, 8 feet), a Scrub Thrush (*Collyriocichla*, sp.), the Ashy-fronted Robin, *Heteromyias cinereifrons*, Yellow-rumped Robin, *Eopsaltria magnirostris*, and a few others. The last-named nests out in the forest, and never by any chance builds in or very close to the scrub. Forest birds do not build in the scrub, nor do the scrub birds build in the forest, therefore when one reads of a Yellow-rumped Robin and a Rifle-bird, *Ptilorhis victoriæ*, nesting in the same tree, strangely at the same time, and within 6 feet of each other, he smiles—very broadly, too! The Yellow-rumped Robin is a dear little bird, and its notes are wonderfully like some of those of the Ashy-fronted. We found it up to 4,000 feet. It is the only yellow-rumped species in the north, but attempts were made (happily upset by North and Mathews) to pass off a variety as a new species. Not only that, but the habitat of the bird was said to be only high country of 3,000 to 5,000 feet—strange, indeed, when we reflect that the highest points in North Queensland, with the exception of the scrub-clad and rarely ascended mountains, Bellenden-Ker and Bartle-Frere, fall short of the greater height by nearly 1,000 feet! This Robin, like some other birds, at times varies a little in colour and size; so do the eggs, which may be found in clutches of two, three, and four. We have seen the bird on a forest patch two miles from Kuranda, at about 1,100 feet, and, out in the open forest, five miles from Kuranda, at about 1,300 feet, it is not rare.

The Tooth-billed Bower-birds', *Scenopœetes dentirostris*, playgrounds received much attention from us, for we were very interested in the alleged snail-shell cracking (on stones) propensities of the birds, as reported by an individual who paid a hurried visit in 1908 to this fearful Queensland. Of course, we failed to discover any evidence in support of his statements, and knew full well that we should not. It is quite likely this bird often builds fairly high, perhaps 30 to 50 feet, but Mr. Sharp found the first nest and eggs * ever discovered, at only 17 feet, and he informed me that he never found any so high

* *Victorian Naturalist*, February, 1909, xxv., p. 160.

as 80 or 90 feet. Without blacks to help search and to climb for us it was waste of valuable time to attempt to find the nests in these great scrubs, where the timber is loftier than in the Atherton district. Our hands were too full of entomological work. Out from early morning until dark, in the scrub on windy and moonlight nights, and on the hills on dark and occasional wet ones—with the right conditions a wet night is quite a productive one. Often my son was out at night, far from any habitation, either in scrub or forest, for my work seldom left me free to accompany him then, the preparation and setting of specimens keeping me in. The fact of him, quite alone, collecting at night, far from any house, without even a dog, and as easy in his mind as if in the company of others, speaks volumes of the deadly fear we entertained of the "evil-looking" blacks. The few blacks in the district are just the same good-humoured, ragged, smoking, and often decrepit-looking creatures one sees in the Atherton, Kuranda, and other well-settled districts, who hang about hoping for odd pieces of bread, meat, and tobacco, and willing to do a little work to get their stomachs filled, then go to sleep or loaf around until hungry again, but as harmless as our wives' pet fowls. This being a truthful and unembellished narrative, I must admit that we did fear these awful blacks at times, more particularly one old chap, who undoubtedly stole one of our largest Zeuzerid chrysalides—to eat! Once or twice the chills of fear crept over me when I came across a band of black youngsters—the leader armed with a murderous-looking tomahawk—at the thought of them discovering and eating, not me or my son, but some of the Zeuzeridæ caterpillars we had located in the bush—fine fat specimens of which they were searching for.

For some days, when collecting in a particular spot, we noticed that two Curlews, *Burhinus grallarius*, were frequently near and greatly interested in our movements. One day I attempted to find the eggs, which I supposed were not far away, but without success, so turned off in another direction, but had not gone many yards when a slight noise behind caused me to turn, and there were the birds, not more than six feet off, with wings extended, hissing and showing great anger. Whether they would have actually struck at me I cannot say. They both stood, so, supposing the young or eggs were close by, I looked a little longer, one bird keeping very close and bouncing me, moving forward or backward as I moved. Next day, having a few minutes to spare, I again went to the spot, and up came the birds, one keeping close to me as before, and angrily disputing my advance, nor was she alarmed when I pushed my net stick close to her, but just gingerly stepped a

little aside. Finally, I saw the eggs, and walked towards them, the bird slowly retreating as I advanced, yet always within six or seven feet of me ; but directly I reached the eggs she, with head bent down, ran quickly away, her mate, who kept further off, joining and running with her ; nor would they return, though I stooped over and touched the eggs, they quietly watching me from under a tree some fifty yards away. Next day one egg was chipped, both birds coming close up as usual, and the day after the first chick was out and the other egg chipped ; then I left the devoted birds in peace.

We had no trouble with snakes, but killed a few. A large black species with greenish abdomen was the only poisonous one we met with, unless we except a seven-inch specimen of the Brown Snake found under a log in grassy country. The slender greenish or yellowish species which frequent shrubs and trees are not worth the trouble of killing. Perhaps they should be destroyed, as they are egg-robbers and bird-murderers. No death-adders were observed, though doubtless they are present in rocky localities. A large grey iguana was seen occasionally, but lizards were generally rare. Centipedes were plentiful ; not so tarantulas and other spiders.

Altogether, the trip was an interesting and successful one, but I regretted that I was unable to spend six months there instead of three. There are drawbacks, of course : January and February are too rainy to be pleasant, and this year March must have been an unusually wet month ; it is generally referred to by residents as the worst. Mosquitoes were almost entirely absent, and for the first three summer months for years I slept without a mosquito-net. No worrying bush-flies in the daytime, but leeches, ticks, and scrub-itch are in strong force, and are excessively annoying. One big striped leech, frequenting the grass near the scrubs and along the watercourses, is extremely active and unusually gluttonous ; its bite often bleeds very freely. One quickly gets to know the nip or feel the crawl of the creature, and it can be removed before operations are properly under way. We were often surprised, after quick walks through the grass, to find how many of these disgusting things could attach themselves to our boots and clothing. Scrub-leeches were not numerous, and gave us little trouble, nor did the scrub-ticks, but a diminutive one, in places here and there in the grass of the forest, is a great nuisance. Frequently, after a few hours' collecting, we would have fifty or more attached to us, and, I must admit, the itching bites had to be violently rubbed or scratched until the pestiferous little wretches were dislodged ; off would come a fragment of cuticle too, but what matter, so long as we obtained relief ? We learnt in time where these ticks were particularly bad, and avoided such

spots with the utmost care. I have, comparatively recently, read of a nervous oologist from the south, posing as a hardened and experienced bushman, who stayed in camp for a whole day, for fear of blood-poisoning setting in from the bites of leeches and scrub-itch. The latter is annoying enough, but not so bad by far as these tiny ticks, nor does the scrub-itch cause, as reported, "torturing sores" on man, beast, or bird. No man has ever yet shot a bird (especially a Tooth-bill) suffering from scrub-itch sores. To pretend that one endures "absolute torture" from the bites of the tiny Acarid, after being in the scrub a few hours, is most amusing. However, the long bow must be frequently drawn to make up pretty stories and show what heroes have to endure. Sores, if developed through scrub-itch bites, are brought on by the person himself. Most fortunate it is that these several pests of the forest and scrub do not poison our blood, such as splinters and other foreign objects are apt to do; but a scrub-tick will kill the largest dog, or bring on strange and almost alarming symptoms in a child, as we know by actual experience. A few plain facts, such as are given in the above fifteen or twenty lines, and in other portions of these notes, are very necessary, for innocent and untravelled southerners might come to look upon our wonderful scrubs as awful places, frequented only by horrific snakes and fierce cannibalistic blacks, and therefore places to be very carefully avoided if they desire to live to a good ripe age. Again, I must not omit to mention that the Fever Fiend does not stalk through these scrubs—*i.e.*, those of Atherton, Evelyn, and other elevated parts; even down on the coast malarial fever is nowadays very rare.

To get my collections safely to Herberton, it was necessary to carry them by hand, the jolting of a buggy, no matter how carefully driven, being much too risky. We had taken in a portion previously and sent it on to Kuranda, and that remaining my son and I carried in on the morning of my departure. We left at 6 o'clock, to catch the train leaving at 9.35. The walk over the twelve miles (surveyed) was generally pleasant and interesting. The country was dry and brown when I passed through in November, but now it was covered with fresh green grass, with flowers here and there, and the notes and songs of birds added to the pleasure of the walk. The morning was bright and dewy, tall box-trees were in flower, providing various birds with their breakfast. To my surprise and delight I heard, the first time for very many years, the clear, unmistakable notes of the Bell-bird, *Oreoica cristata*, but the last note seemed slightly different from that of the bird as I have heard it in Victoria.

CORRESPONDENCE.

THE ALTERATION OF THE QUAIL SEASON.

To the Editor of the Victorian Naturalist.

Sir,—The paper entitled "The Alteration of the Quail Season and its Effect," by Mr. G. A. Keartland, printed in your September number, has been brought under my notice. The writer's statements could be criticised very forcibly; but, in my opinion, any man who bases his arguments on the 1911 season, when the breeding was admittedly quite "out of gear," owing to abnormal climatic conditions, &c., cannot be taken seriously.

By the way, however, Mr. Keartland twice mentions the 14th February as the opening day for quail for this year, and shows that he "shot a few brace" on that day. If he did so, and will admit it in court, I shall be glad to ask the bench to make the cost of the few brace somewhat higher than he intended. Probably, however, Mr. Keartland's two references to the 14th February were errors, and rather simple ones at that. If so, are there any other errors among his statements? His remark that he has not been out since 18th February, "as the few old birds have been shot, and there are no young ones coming on," is possibly a sample, and I shall leave it in the hands of a large number of sportsmen who had excellent quail-shooting in June and July.

The matter of the close season for quail is a very difficult one, and the alteration was not decided upon without a good deal of investigation. Criticism is welcomed, also the experience and opinion of careful observers; but ridiculous statements, such as—"The best proof of the absurdity of the last alteration of the opening day of the season is to be gained by a perusal of the Fish Market reports in the daily press. During May quail realized up to 2s. per brace by auction," will certainly not assist the matter, especially when they refer to one season only, and that an abnormal one.—I am, yours, &c.,

J. M. SEMMENS,
Chief Inspector of Game and Fisheries.

Melbourne, 29th September, 1911.

[The error in the date was observed and corrected by Mr. Keartland in the October *Naturalist*.—Ed. *Vict. Nat.*]

To the Editor, Victorian Naturalist.

Sir,—I must thank you for your courtesy in submitting Mr. Semmens's letter to me for early reply. The error in date I freely admit, and have already corrected; but Mr. Semmens is also in error in supposing that my arguments are based on this "abnormal season." I was in hopes that the abnormal season

theory was entitled to a rest, as I have heard it quoted on every deputation on the quail question which I have attended. It may interest Mr. Semmens to know that I speak from fifty years' experience as a sportsman and over forty years as a careful observer, during which time I have not only bred quail in my aviary, but in 1909 had the pleasure of watching marked birds breeding in a paddock adjoining my property. I have studied the birds in the Ballarat, Maryborough, Nhill, Melton, Heidelberg, and Preston districts of Victoria; in Riverina, N.S.W.: in Central and North-West Australia; and on that experience base my arguments. That sportsmen may get good quail-shooting in June and July I can freely endorse, as I have frequently stated in press correspondence and on deputations: but it has always been on property where the birds have been allowed to finish breeding and the young ones have matured. It would, perhaps, interest the readers of the *Naturalist* to hear why the late Sir Thomas Bent, after gazetting an early opening of the shooting season, which I, with others, opposed, cancelled his order after about a fortnight's trial. Rumour states that he was inundated with parcels of little, half-fledged, young quail. He certainly had some sent him, and, like a gentleman, admitted his mistake. Quail breed from October to the end of March if undisturbed, but where they are harassed they soon shift to other quarters. This is illustrated in the fact that they soon leave sheep country, but remain in agricultural or cattle country. When I stated that "the old birds had been shot, and there were no young ones coming on," I was alluding to the places with which I am familiar. I can find quail now in places where they are protected, but in open country, to which the general public had access, very few birds were found after 1st March. I regret that Mr. Semmens did not consult the advisory committee or some of the ornithological societies, or, better still, some of the correspondence in the possession of the Government, before rushing into print. I have spared neither time nor money in my endeavours to increase the supply of quail. Ten years ago I issued 347 circulars, containing a series of questions, to all the sportsmen whose addresses I could ascertain, and in nearly every case they endorsed my view—that the end of March is soon enough to start shooting. I have distributed nearly all the reprints of my paper amongst land-owners and sportsmen, without receiving a single contradiction. It would have been more satisfactory to have had a few arguments in support of the alteration in the *Game Act* instead of a general contradiction and copious quotations. To get at the best way of increasing the number of birds is my object. Apologizing for thus trespassing on your space, I am, &c.,

Preston, 30th October. G. A. KEARTLAND.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th November, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 40 members and visitors were present.

CORRESPONDENCE.

From Dr. Douglas Mawson, leader of the Australasian Antarctic Expedition, thanking the Club for its donation of £5 towards the funds of the expedition, which, he said, was especially welcome, coming as it did from fellow-scientists.

REPORTS.

A report of the excursion to Sandringham on Saturday, 14th October, was given by the leader, Mr. C. A. Topp, LL.B., who said that there had been a good attendance of members, and an enjoyable afternoon had been spent, but no novelties had been reported, the usual spring flowers being fairly plentiful.

A report of the excursion to the Metropolitan Farm at Werribee on Saturday, 21st October, was given by the leader, Mr. G. A Keartland, who said that there had been a good attendance of members, who, besides studying the natural history of the farm, had the opportunity of seeing how the sewage of Melbourne was disposed of. The bird-life, though numerous, was not very varied, and he had been somewhat disappointed in the results of the afternoon. It was interesting to find the little Grass-bird, *Megalurus gramineus*, nesting quite close to the shore-line. Regarding the botanical aspects of the excursion, Dr. Sutton reported that the flora was very similar to that on the eastern side of Port Phillip. The principal plants noted were :—*Atriplex cinereum* (tree form), *Salicornia arbuscula*, *S. Australis*, *Suæda maritima*, *Apium prostratum*, *Mesembryanthemum australe*, *Frankenia lævis*, *Samolus repens*, *Wilsonia rotundifolia*, *W. humilis*, and *Cotula filifolia*.

A report of the excursion on the Upper Yarra on Saturday, 4th November, was given by the leader, Mr. A. D. Hardy, F.L.S., who said that, favoured by splendid weather, a most enjoyable outing had resulted, but the date was found to be rather late for the flowering of the majority of the shrubs, &c., along the river banks.

A report of the excursion to Nyora on Cup Day, Tuesday, 7th November, was given by Mr. J. Searle, who said that,

though the party had consisted of himself and his son only, he had been thoroughly satisfied with the outing. He had devoted himself to the pond-life of the district, and had secured some new records, also an unrecorded species of Brunella, of which he purposed giving some account at a future meeting.

A report of the excursion to Mooroolbark on Saturday, 11th November, was given by Mr. F. G. A. Barnard, who acted as leader in the unavoidable absence of Mr. C. French, jun. He said that there had been a good attendance of members, who were greatly interested in the various specimens met with, and, though nothing of particular interest was collected, still a useful and instructive afternoon had been spent.

A report of the junior excursion from Croydon to Mooroolbark on Saturday, 4th November, was forwarded by the leader, Mr. C. French, jun., who reported a fair attendance of juniors. The afternoon had been spent in a search for insects, of which a fair number of the commoner kinds was found, and about which information was given to the members of the party.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. E. J. Dunn, F.G.S., Mines Department, Melbourne, Mr. M. G. Mackenzie, Lands Department, Melbourne, Mr. L. B. Stanton, Princess-street, Kew, and Mr. H. B. Wright, 172 William-street, Melbourne, were duly elected as ordinary members; Miss Omi Dines, Dummagudem, South India, as a country member; and Master Cecil Whight, Park-street, South Yarra, as a junior member of the Club.

GENERAL BUSINESS.

On the motion of Messrs. Barnard and Wisewould, a vote of thanks was passed to Mr. F. J. Cayley, of Werribee, for his assistance in carrying out the recent excursion to the Metropolitan Farm.

Mr. R. A. Keble referred to the trouble that was arising along the banks of the Yarra from the use of motor boats of certain types on the river. The banks were being undermined, and large trees which are growing near the water's edge will, unless some definite action is early taken, fall into the stream, and add further to the dangers of navigating the river, besides being a considerable loss to the river from a scenic point of view.

Mr. Hardy endorsed the remarks, and promised to consult the officers of the Public Works Department in order to see what steps can be taken.

PAPER READ.

1. By Mr. J. W. Audas, entitled "Botanical Gleanings of a Trip to the Omeo District."

The author described in an interesting way the many botanical specimens met with during a trip from Bairnsdale up the Tambo Valley and over the Alps to Omeo. The latter district, though at an elevation of about 2,200 feet, did not provide such interesting botanical material as might have been expected.

Messrs. Topp, M'Lennan, Pitcher, and Barnard took part in a short discussion which followed.

NATURAL HISTORY NOTE.

Dr. T. S. Hall, M.A., called attention to his exhibit of "pineapple" opal, a rather rare occurrence, and gave some explanation of its composition and probable formation.

EXHIBITS.

By Mr. J. W. Audas.—Dried specimens of the following plants in illustration of his paper:—*Adriana tomentosa*, Gaud., Woolly Bitter-bush; *Pultenæa stricta*, var. *Gunnii*, Golden Bush-Pea, with Witches' Broom; *Dodonæa viscosa*, var. *attenuata*, Hop-bush; *Plectanthrus parviflorus*, Henck., Cockspur flower: *Eriostemon myoporoides*, D.C., Long-leaved Wax-flower; *Cassia Australis*, Sims, Spice-bush; *Acacia oxycedrus*, Sieb., Spike Acacia; *Calythrix tetragona*, Lab., Four-cornered Buttercup, and *Ramalina Eckloni*, Spreng., on twig of Melaleuca; petrified wood from Oriental Sluicing Claim, Omeo.

By Mr. F. Cayley.—Flowers of Bladderwort, *Utricularia dichotoma*, and leaves of Nardoo, *Marsilea Drummondi*, from Werribee.

By Dr. T. S. Hall, M.A.—Pineapple opal, from White Cliffs, New South Wales.

By Mr. A. L. Scott.—Specimen of the Sow Thistle, *Sonchus oleraceus*, L., an introduced weed, which was breaking down a sound wall.

By Mr. J. Searle.—New species of Copepoda, of the genera Bœckella and Brunella, collected at Nyora, South-West Gippsland, 7th November.

By Mr. F. Spry.—A bred specimen of the beetle, *Sclerocyphon maculatus*, Blkb.; *Eucharis*, sp. (order Hymenoptera), found in nest of ant, *Ectatomma*, sp.; a bred specimen of moth, *Asura lydia*, Don., larvæ found under a stone with ant, *Iridomyrmex*, sp.

After the usual conversazione the meeting terminated.

OCTOBER MEETING.

The following abstracts of excursion reports read at the October meeting of the Club could not be published last month on account of pressure on our space:—

A report of the excursion from Sandringham to Cheltenham on Saturday, 23rd September, was given by the leader, Mr. J. R. Tovey, who said that, doubtless owing to the showery morning, the attendance had not been as large as was expected. However, about a dozen members took part in the outing, and were favoured with a delightful afternoon. The spring flowers were in evidence everywhere, and at least fifty species were met with during the four-mile walk. Six species of orchids—viz., *Diuris maculata*, Leopard Orchid, *D. sulphurea*, Tiger Orchid, *Thelymitra antennifera*, Yellow-hood Orchid, *Caladenia Patersoni*, Spider Orchid, *C. carnea*, Pink Fairies, and *Glossodia major*, the Larger Glossodia, were collected. On the roadside near Cheltenham a white-flowered form of the introduced plant, *Bartsia latifolia*, Sibth. and Sm., was found, apparently the first record of this plant with white flowers.

A report of the excursion to Ferntree Gully on Saturday, 30th September, was given by the leader, Mr. J. P. M'Lennan, who reported a good attendance of members. Attention was first directed to the flora of the flat country at the foot of the range, the latter being afterwards explored to a slight extent. Between 80 and 90 plants were noted, of which more than 60 were in bloom. The order Leguminosæ furnished seventeen species, *Pultenæa pedunculata*, the Trailing Bush-Pea, being the most uncommon. Other plants which were at their best were *Acacia myrtifolia*, Myrtle-leaved Acacia, *Aster* (*Olearia*) *stellulatus*, var. *lyrata*, Snow-bush Aster, *Comesperma volubile*, Love Creeper, *Daviesia latifolia*, Broad-leaved Bitter-Pea, *D. corymbosa*, Narrow-leaved Bitter-Pea, *Goodia lotifolia*, Tretal, *Glycine clandestina*, Delicate Glycine, *Pultenæa Gunnii*, Golden Bush-Pea, *Pimelea axiflora*, Tough Rice-flower, *Tetratheca ciliata*, Pink Eyes, and *Hibbertia stricta*, Rigid Guinea-flower.

A report of the junior excursion to Sandringham on Saturday, 7th October, was given by the leader, Mr. J. P. M'Lennan, who said that there had been a good attendance of juniors. Attention was first of all directed to the different characters of the plants, beginning at high-water mark and continuing up the cliffs, through the tea-tree belt, to the scrub-land beyond. Unfortunately, after about an hour had been pleasantly spent heavy rain came on, necessitating the abandonment of the excursion.

CONVERSAZIONE.

The list of exhibitors of microscopical specimens on page 130 of the November *Naturalist* should have included:—Mr. J. Shephard.—Mounted Rotifera

A TRIP TO THE BASS VALLEY.

By E. BROOKE NICHOLLS.

(*Read before the Field Naturalists' Club of Victoria, 9th October,* 1911.)

HAVING heard the Bass Valley often spoken of as the habitat of one of the rarest of our native animals, and also as the southern limit of certain northern bird forms, such as the Sanguineous Honey-eater, the Carinated or Black-faced Fly-catcher, and the Long-billed Scrub-Wren, it seemed likely that a visit to its vales and hills would prove of interest.

With the object of spending a pleasant holiday and making a record of birds seen and heard, our party of three spent last Easter in and around the valley, and, on the advice of Mr. W. Chapman, of the Powlett River railway construction camp, made Nyora, on the South-Eastern railway, 55 miles from town, our headquarters.

This township is distant some two and a half miles from the valley, but, being the junction for the Bass Valley and Powlett River railways, we found it a convenient centre from which to work. A train leaves Nyora about 9 in the morning, and, after traversing almost the whole length of the valley, cuts through the Bass Ranges close to the sea and continues on to Kilcunda and Wonthaggi. It returns again at five in the evening, thus leaving ample time for an excursion from any of the intervening stations.

Roughly estimated, the Bass Valley is about 20 miles in length. Woodleigh, the first station, some six miles from Nyora, is situated about the middle of the valley, which is there about two miles wide. Ranges of hills, several hundred feet in height, enclose it on either side, and the Bass River, a swollen, muddy stream, a few yards in width, runs at the foot of the western range. We were surprised to find this part of the valley practically denuded of timber, the hills cleared right to their tops and covered with bracken only. On the flats the well-grassed paddocks, blooming with dandelion and red clover, told of many years of occupation. The river is fringed with Silver Wattles, with an occasional blackwood here and there. A few tree-ferns rising some 20 to 25 feet above the grass and clover at their base attest the former luxuriance of the vegetation.

A short distance from the station one or two belts of timber have been left. The trees consist mainly of Messmate and Blue Gum, with Swamp Tea-tree and Bayonet-grass (in seed) in the marshy parts. The timber is being cut for the Powlett mines, and in a few years the Bass Valley will be stripped to the last tree. From the station yard at Woodleigh a short

tram track runs to a timber-cutters' camp, three-quarters of a mile distant. Here a belt of original scrub looked a promising hunting-ground, but a close search revealed nothing of interest ornithologically. The ground was swampy, with isolated patches of dry land, and the moister parts were riddled with the tussock-hidden tunnels of land-crabs and the large earthworms. At every footstep weird subterranean gurglings attracted attention, and it was some time before we found out that the swishing, sucking noises were due to the sudden retreat of the gigantic earthworms into their burrows. On the drier parts one of the so-called native hops, *Goodenia ovata*, with a few late blooms, was growing to a height of five to six feet.

The shrubs emitted a most fragrant perfume as we pushed through them. We were much disappointed in the character of the country. For years past the timber has been cut out for the mines at Korumburra, and latterly for those of the Powlett. Bush-fires have also devastated a great part of the Bass Valley, and we were informed that, after the great fire of 1898, the bodies of dozens of Lyre-birds were found along the banks of the river. No doubt the destruction of marsupial life was equally severe.

In the undergrowth we had disturbed one wallaby for the day. A small orchid and a few plants were collected, and have been identified by Mr. C. French, jun. Only twenty-one species of birds were seen, the most uncommon being the Gang-Gang Cockatoo. Earlier in the day we had come across the wood-cutters' camp. All around lay the fallen timber. A few inquiries called forth the remark that many Flying Phalangers were destroyed during the progress of the work, and the presence of the dead animals lying round the camp bore out the statement. On several occasions phalangers, probably specimens of *Petaurus australis*, had been captured and set free again by the timber-cutters. The description of one of their captures, a small animal no larger than a rat, convinced me that it was a specimen of that rare mammal, Leadbeater's Opossum, *Gymnobelideus leadbeateri*, M'Coy, figured in the "Prodromus of Zoology of Victoria," decade x., pl. 91. The remaining clumps of timber in this valley are the last of the sanctuaries of this exceedingly rare little creature. A description, accompanied by a drawing of the animal, if forwarded through the proper channels to the contractors working in this valley, might result in the securing of specimens either for the Museum or the National Park.

On Sunday morning we left our residence, the Grand Central Coffee Palace—Nyora consists of two stores, one hotel, and several houses—and, taking a local track, strolled a mile or

two into the scrub. Passing several neglected orchards, we saw vast quantities of apples on the ground. These provided a feast for numerous parrots, starlings, and wattle-birds. An interesting feature of this walk was the finding of an "ivy" bush in flower, swarming in parts with small flying insects (midges). So thick were these that at a short distance parts of the green ivy appeared blue-black in colour. A leaf two or three square inches in area accommodated hundreds of the insects. When disturbed by throwing a stick into the bush they fell off in a cloud as thick as smoke. Again birds were few in number, and a solitary Yellow Robin was added to the list.

In the afternoon we followed the railway line for some two miles back to town. Another native hop, *Daviesia latifolia*, grows in profusion along the track, and, though not in flower, emitted a sweet perfume during a slight shower of rain. Stepping off the line into a foot-track, we climbed Gardiner's Hill, our destination. It was whilst walking up the hill that we found how numerous and ferocious the mosquitoes were this season. The late rains had caused a plague of these pests all over the State, but at no place were they worse than here. They accompanied us in thousands, and the torture they inflicted will be remembered for a long time. The hillside we climbed was very damp, and in a little dell at the foot a species of hakea and the coral fern grow profusely. The soil is light and sandy, like that of a typical sand-dune, and at the summit pink, red, and white heath flourished. From here a splendid view was obtained of Phillip and French Islands and the Mornington Peninsula, with the waters of Western Port gleaming in between. On the downward slope of the hill we found the soil red, rich, and volcanic, and the owner of the land showed us a wonderful bed of gladioli of all shapes and of the most vivid colouring. The latter he attributed partly to the sea breeze, which blows freely across the hill-tops, and partly to the red soil. He asked for an explanation of this outcrop of volcanic soil amidst the sand, but we could not explain it. The presence in the house of two paintings by Neville Cayley, one of a Blue Wren and the other of a Striated Pardalote, *P. ornatus*, elicited the fact that they had been purchased at a recent local sale for 5s. 6d. the two! We congratulated the owner upon the possession of the paintings, whose value must be at least twenty guineas. He was surprised at his good fortune, and grateful for the information.

On Easter Monday we left Nyora to visit a piece of virgin country four and a half miles distant, on the road to Poowong. The valley having proved a failure, we decided to try its ex-

treme head, at a place known as "Dunlop's Patch," a remnant of the original scrub. On the road out we halted to investigate a piece of likely-looking ground for Emu-Wrens. After half an hour's search we put up a few field-wrens, *Calamanthus*, and that was all. We had a good opportunity of observing the way in which these tiny ground-birds stick close to cover. They were very difficult to flush, flew just on a level with the Swamp Tea-tree, and only betrayed their position by their sharp, short call notes. The day was warm and the road up hill, winding, and muddy. One honey-eater, the White-eared, was seen, also several hunting parties of Acanthizas. All throughout the trip we came across the winter bands of these tits, or thornbills, consisting of several species—the Yellow-tailed, *Acanthiza chrysorrhoa*, Buff-tailed, *A. reguloides*, and the Striated, *A. lineata*. Every band was accompanied by a pair of White-shafted Fantails. Magpies and Butcher-Birds were plentiful along the road, and the rich, flute-like notes of the latter sounded clear and sharp in the vales between the hills.

At a bend in the road the distant Baw Baws stood out away to the north, distinct against the sky-line, with Mount Baw Baw raising its head above the rest of the range. It was probably seventy miles away, and all the country in between seemed bare of green timber, even to the crests of the hill-tops. The one fact that impressed us right throughout the trip was the disappearance of the forest and undergrowth. Another twenty years, and there will hardly be a tree standing in the district. The National Park at Wilson's Promontory has not been acquired a bit too soon.

Arriving at Dunlop's, we ascertained that the 200 acres of timbered country before us was not original scrub. Twenty years ago the proprietor cut it out, and the present growth is a secondary one. In this patch the trees, chiefly messmate, are slender spars for the most part, 80 to 100 feet high, with a few of the monarchs of the virgin timber still standing. The long hill slope from the farm leads down to a small creek, in which tree-ferns, dogwood, musk, hazel, clematis, and all the tangle of a Gipsland gully undergrowth, still remains. Halfway down the hill we boiled the billy. Birds were very scarce, a few Thornbills, Rosellas, Butcher-birds, Scrub-Wrens, with an occasional Tree-creeper and Scarlet-breasted Robin being noted.

The call notes of the Butcher-birds in this gully were wonderful, both in number and variety. The whole valley seemed to resound with them, and we heard the calls of many other birds we did not see. They followed one another in quick succession

—the Harmonious Thrush, Wattle-birds, Pennant's Parrakeet, Grey Magpies, and others. We were on the look-out for the Lyre-bird, but had not seen it or heard its call. Then, in a flash, we realized we had been listening to the bird for some minutes. The rapid succession of different calls from unseen birds forced the truth upon us. We concluded the Lyre-birds were not more than 200 yards from us, and started to locate them. Stepping, slipping, and falling quietly down hill through the dense undergrowth, we got to within thirty yards of them. Then we seated ourselves and listened to the most wonderful and beautiful series of bird notes it has been our good fortune to hear. For several minutes we sat in a spell of delight, and then, recovering, copied down on the spot the calls as they were imitated. And when we say imitated we mean more than the word conveys, for every note and sound was a perfect reproduction of the call of the bird mimicked, and, as Mr. Milligan declared, was rendered with more grace and finish than it would be by the original itself.

The following is the list of calls, taken down at the time :—

1.—Native Bear.
2.—Young Magpie being fed.
3.—Boobook Owl (deep, guttural, and a perfect imitation).
4.—White-throated Thickhead.
5, 6, and 7.—Three calls of the Harmonious Thrush—first, the single high-pitched alarm note ; second, the "Choked, choked with a cherry" call ; third, a second alarm call, consisting of several notes pitched in the same key.
8.—Starling. "The indrawn whistle," likened by Mr. Milligan to the swish of a rocket.
9.—The Satin Bower-bird.
10.—Butcher-bird.
11.—Wattle-bird.
12.—Whistling Eagle.
13.—Black Cockatoo.
14.—Alarm notes of a flock of startled parrots. In mimicking these notes the fluttering and winnowing sounds of the wings of the rising birds were accurately represented.
15.—Pennant's Parrakeet.
16.—Magpie's alarm note.
17.—Scrub-Wren.
18.—*Acanthiza pusilla* (scolding note).
19.—Laughing Jackass (the gurgling notes at the beginning of the laugh only).
20.—Strepera.
21.—Creaking of tree limbs moved by the wind.

22 and 23.—Mechanical sounds. The first, repeated rapidly, sounded like "Chōō, chōō, chōō, chōō." This we afterwards recognized as the sound made by the engines of the heavy coal-laden trains as they puffed up a sharp incline just outside the Nyora railway yard, some four and a half miles distant from this valley. The other was a soft note slowly repeated, and might have represented the sound of a broad axe at work on a log.

24.—Two Magpies meeting in the air. This was a reproduction of loud notes uttered when two Magpies meet in collision in mid-air.

25.—Coachwhip-bird.

Whilst listening to this wonderful performance we caught sight of one of the birds. From the rapidity with which the calls were uttered, and the different directions in which they were coming, we concluded that there were two birds engaged in a rivalry of song. The bird we had seen discovered us, and, crossing the creek, it climbed the slope we were on and came round the back of us to within ten yards. It was a female. This bird uttered not a note whilst we watched it, and all the time it was on the move the mimicry continued. We then walked forward to catch a sight of the singer, and got to within twenty yards of the male bird when it broke cover. For a moment we saw the bird, and then it disappeared, and we had heard the last of the performance. We had been listening for forty minutes, and for half an hour of that time had been within 25 to 30 yards of the Lyre-bird.

Examining the ground, we found it scratched and turned in all directions. No dancing-mound was to be seen, so the entertainment was gone through whilst the birds, or at least the female, was feeding. Just as we were preparing to leave the spot, a series of shrill cries attracted us, and in a few seconds the male and female Lyre-birds dashed past into the scrub. They were the pair we had been watching, and passed so near that we stretched out our hands to capture them. We searched carefully for a nest, but without success. There are one or two points of interest in connection with the behaviour of the birds and the order in which the call notes of the various birds followed one another. The female undoubtedly saw us, but apparently gave no warning or alarm note of any kind; and she took no part whatever in the vocal performance. The imitations were not always rendered in the full sequence given in the list. Whilst both birds were undisturbed it was adhered to, call following call in unbroken succession. But when the female came over to us the song was interrupted by pauses

and single imitations, those of the Butcher-bird and the rising of the parrot-flocks being often repeated. A new series always commenced with the second note of the Harmonious Thrush. The call of the Mopoke was given only twice. Sounds that were similar and bird calls pitched in the same key, or that harmonized, always followed one another. The two mechanical sounds were always kept together, as were the cries of the Whistling Eagle and Black Cockatoo. The notes of the smaller birds, the Thornbills and Scrub-Wrens, always followed in sequence, and when these calls were uttered the whole volume of the Lyre-bird's voice was modulated and toned down to low, whispering notes.

On the Tuesday we visited Woolamai, the sea end of the valley, some seventeen miles from Nyora. The railway station is about ten miles from the cape of the same name, which forms the eastern extremity of Phillip Island. Leaving the valley, we followed a road two and a half miles to a local eminence known as Finney's Hill. From here we had a splendid view of the surrounding Bass Ranges. On one side we caught glimpses through the trees of the distant township of Wonthaggi and the white-capped waves of Bass Strait; whilst on the other hand, nine miles away, were the waters of Western Port, with Phillip, French, Pelican, and Elizabeth Islands standing out clear and distinct. The estuary of the Bass spread out before us, and we could see where the main stream entered Western Port, some four miles above San Remo. These distances were given me by a resident.

The Spotted Ground-bird was added to the list, and we also saw, in one company, two male Flame-breasted Robins in full plumage and six young male birds without any colouring. We also came across a large hunting band of Acanthizas, and with them were Blue Wrens, Scrub-Wrens, a female Whistler (Thickhead), and a pair of Harmonious Thrushes, together with the ubiquitous White-shafted Fantails.

We disturbed a few wallaby in the hill-tops. On our return to the station we incidentally heard that last Christmas thirty Koalas, or Native Bears, had been sold on the platform to travellers at half-a-crown a head. Ant-eaters are fairly common about Wonthaggi, which is only some two miles from the sea. At the Woolamai station we were much interested in three bags of oysters, each weighing about 150 lbs., and consigned to Melbourne. Later on we sampled some of them at a Swanston-street fish shop, and found them decidedly muddy in colour and flavour.

Another day we visited Wonthaggi and descended one of the mine shafts. There were then twenty-one miles of coal drives,

opened up after twelve months' work. I believe this constitutes a record. It was whilst journeying in the train to this town that we overheard an interesting conversation. It appears that during the summer season the week-end trip which the resident of Wonthaggi most favours is one to the Mutton-bird rookery at Cape Woolamai. Every Saturday and Sunday motor boats constantly ply between San Remo and the Cape. One man has three large launches, and these are going all day long. Last Christmas hundreds of people visited the rookery, disturbing and destroying the birds and their young. Our travelling companion was looking forward to a sporting time next season; hence the last mainland stronghold of the Mutton-bird is doomed.

In the appended list of the principal birds seen I have adopted the latest names, as used in Leach's "An Australian Bird Book"; and in that of the plants I have added the popular names provisionally adopted by the Plant Names Committee, in order that readers may become familiar with them.

BIRDS OF BASS VALLEY—EASTER, 1911.

Synœcus australis	Brown Quail
Cerchneis cenchroides	Nankeen Kestrel
Callocephalum galeatum	Gang-Gang Cockatoo
Platycercus elegans	Crimson Parrot
P. eximius	Rosella Parrot
Dacelo gigas	Laughing Kingfisher (Kookaburra)
Menura victoriæ	Lyre-bird
Chelidon (Hirundo) neoxena ..	Welcome Swallow
Micrœca fascinans	Brown Flycatcher
Petroica leggii	Scarlet-breasted Robin
P. phœnicea	Flame-breasted Robin
Rhipidura albiscapa	White-shafted Fantail
R. motacilloides (tricolor) ..	Black and White Fantail
Coracina robusta (Graucalus melanops)	Black-faced Cuckoo-Shrike
Cinclosoma punctatum	Spotted Ground-bird
Calamanthus albilorus	White-browed Field-Wren
Ephthianura albifrons	White-fronted Chat
Acanthiza lineata	Striated Tit-Warbler
A. uropygialis	Chestnut-rumped Tit-Warbler
A. chrysorrhoa	Yellow-tailed Tit-Warbler
A. reguloides	Buff-tailed Tit-Warbler
Sericornis frontalis	White-browed Scrub-Wren
Malurus cyanochlamys	Superb Warbler (in full plumage)
Artamus tenebrosus (A. sordidus) ..	Wood-Swallow (clustering)
Grallina picata	Magpie-Lark
Colluricincla harmonica	Grey Shrike-Thrush
Gymnorhina leuconota	White-backed Magpie
Cracticus destructor	Australian Butcher-Bird
Pachycephala pectoralis	Golden-breasted Whistler (White-throated Thickhead)
Eopsaltria australis	Yellow-breasted Shrike-Robin

Neositta (Sittella) chrysoptera	Orange-winged Nuthatch
Climacteris scandens	Brown Tree-creeper
Pardalotus ornatus	Red-tipped Diamond-bird
P. punctatus	Spotted Diamond-bird
Anthus australis	Australian Pipit
Ptilotis leucotis	White-eared Honey-eater
Acanthochæra carunculata	Wattle-bird

PLANTS OF BASS VALLEY—EASTER 1911.

Hypericum japonicum	Small St. John's Wort
Geranium dissectum	Cut-leaved Geranium
Pultenæa daphnoides	Large-leaved Bush-Pea
P. scabra	Rough Bush-Pea
Daviesia latifolia	Broad-leaved Bitter-Pea
Platylobium obtusangulum	Burrumbeet Flat-Pea
Bauera rubioides	Wiry Eurella
Melaleuca ericifolia	Swamp Paper-bark
M. squarrosa	Scented Paper-bark
Leptospermum myrsinoides	Pink Tea-tree
L. scoparium	Manuka
Persoonia juniperina	Prickly Geebung
Banksia collina	Hill Banksia
Gnaphalium japonicum	Japanese Cudweed
Chrysanthemum leucanthemum	
Wahlenbergia gracilis	Austral Bluebell
Goodenia ovata	Shrubby Goldenhands
Dampiera stricta	
Styphelia scoparia	Honeybags
S. australis	
Epacris impressa	Common Heath
Eriochilus autumnalis	Autumn Orchid
Hypoxis glabella	Yellow Stars
Selaginella uliginosum	Swamp Club-Moss
Gleichenia circinata	Coral Fern
Blechnum cartilagineum	Gristle Fern

EXCHANGE.—Mons. L. Vignal, 28 Avenue Duquesne, Paris (Treasurer Société Zoologique de France), is anxious to exchange Paris Eocene and Bordeaux and Dux Miocene fossils for Australian Tertiary fossils.

A NEW RELAXING TIN.—The Newman relaxing tins, which have been mentioned in English publications lately, are now available in Victoria. These tins are ready charged, and require no addition of moisture. Insects placed in them can be left for weeks without the slightest danger of mould. In March last half a dozen specimens of the common skipper butterfly, *H. compacta*, one of the most difficult of our butterflies to set, were placed in one of these tins, and left through the winter. When taken out a few weeks ago they were readily set without any trouble. This plan will be appreciated by those who have tried to set skipper butterflies which are just a little too stiff. Particulars will be found in the advertisement of Messrs. Cherry and Sons, of Gisborne.

IN THE WESTERN LAKE DISTRICT.

By F. G. A. BARNARD.

(*Read before the Field Naturalists' Club of Victoria, 9th October,* 1911.)

ALTHOUGH during the thirty years this Club has been in existence papers dealing with various parts of Victoria have been read from time to time, that interesting portion of the State around Camperdown has been left severely alone. Possibly this neglect has been from the reason of the rich pasture-land of the district being non-productive of many novelties in botany or entomology ; but there are other features which should prove attractive to the naturalist, and, with the view of calling attention to the possibilities of the locality, I purpose giving some account of a four days' trip taken last Easter.

Easter, if preceded a few weeks before by a genial rainfall, is often a very pleasant time of year for a ramble in the country, though not at all promising to the botanist or entomologist. The geologist and physiographist, however, can find something interesting at any time of year, and it is mainly with the geology and physiography I purpose dealing this evening.

The district was entirely new to me, as Geelong had, up to then, been my farthest point in that direction. I had long wanted to see those remarkable lakes, Gnotuk and Bullen-Merri ; so, putting Professor Gregory's "Geography of Victoria" in my pocket to serve as a guide-book, I took the train for Colac on Good Friday morning. The crush at the ticket-office was something to be remembered, and proved fatal to some collecting tubes in my breast pocket.

Geelong was reached nearly an hour late, which did not augur well for the rest of the journey. A distant glimpse of the position of Lake Connewarre is obtained as the Barwon is crossed, and then the Barrabool Hills (limestone) come in sight on the right. At Buckley the expanse of Lake Modewarre is seen not far from the line. The Barwon is again crossed soon after leaving Winchelsea, this time flowing north. We are travelling almost on the boundary of the volcanic and the recent formations, the former being on our right, or northern, side, and presently marked by two conspicuous hills, Mounts Gellibrand and Hesse, named after the first white men to sacrifice their lives in the interests of the exploration of the district, some seventy years ago. Away to the south can be seen the outliers of the Otway Ranges, amongst the gullies of which they are supposed to have become entangled, leaving no trace behind.

Soon after passing Irrewarra the line skirts the southern shore of Lake Colac, a fine sheet of water about twenty miles in circumference, across which there is a lovely view of the

Warrion Hills, of which more anon. At Colac, 95 miles from town, we were still an hour late. The narrow-gauge line to Beech Forest commences here, and, as a train was waiting our arrival, I took a ticket for Coram, five miles out, 400 feet above Colac, on the summit of the divide between the Gellibrand River, flowing into the ocean, and the Barongarook Creek, flowing into Lake Colac. The line winds up the hills, somewhat after the manner of the Gembrook line, crossing on the way the pipe-track of the new water supply for Colac. At Coram I left the train, and found myself in country very similar to that about Evelyn. Spikes of epacris, red and white, were showing here and there. Rambling along the road towards Colac, I soon came to a turn from which I had a fine view not only of Lake Colac, but the huge expanse of Corangamite and many other smaller lakes. Numerous volcanic hills dominated the landscape, the grandest of them being Mount Elephant, rising abruptly from the plain some thirty miles away on the other side of Corangamite. The road gradually descended till I reached the slightly undulating area in which the town is situated. Quickly finding a place in which to stay the night, I made my way towards the lake. By this time some sharp squalls had come up, and considerable waves were rolling on the shore, and, rain coming on, I had to make for shelter, so that I was unable to note the vegetation near the water: however, the view of the Warrions in the setting sun was some compensation.

Next morning I was up betimes, and went for a walk along the road through East Colac to Cameron's Hill, from which I had a fine view of the Warrions, gradually opening up under the light of the rising sun. I was advised to go out to the Red Rock at Alvie, really the southernmost hill of the Warrions, for the sake of the great view to be obtained there, so started off after breakfast for the eleven-mile walk, intending to return by the afternoon coach; but I had not gone far before a resident driving in the same direction offered me a lift, which, as time was precious, I did not decline. Our road lay through some of the famous squatting stations of bygone days—the Robertsons' and others, whose Colac shorthorns were champions at many Victorian shows. Now all is changed. Dairying occupies the land, and marvellous tales are told of the monthly cheques paid for milk by the Cororooke Butter Factory. And no wonder. The soil is magnificent—volcanic, red and black—with water at no great depth, which, with a good rainfall, keeps the paddocks green almost all the year round.

The road hereabouts was rather peculiar—a regular switchback—up and down, with apparently no means of drainage;

but doubtless the porous soil absorbed the water in the hollows, and so gave no trouble to the shire engineer. Some of the finest country mansions in Victoria are just about here, and, like nearly everyone else in the district, connected by telephone with the town. At a turn in the road Lake Coragulac is passed; but, being probably an extinct crater, situated in a deep hollow, the water is invisible from the road. A little farther on Alvie Church comes in view, and the hill behind is that known as the "Red Rock." As it was yet early, I decided to go on another mile with my friend and climb the highest hill of the Warrions and return to the Red Rock, and pick him up in the afternoon for the return drive to Colac. The road turned due north, and soon I seemed to be able to make a good approach to Mount Warrion, indicated by a pole on the summit of the ridge. I was approaching it from the western side, and by a little dodging about from ridge to ridge reached the top with very little exertion. Several basaltic outcrops were visited on the way, but nothing of note seen. The Tree-Violet, *Hymenanthera Banksii*, was common, but in a very stunted form, and literally covered with lichens—in fact, I have never seen a place where lichens are more numerous than on the stones of the Warrion Hills.

Reaching the top just at noon, I spent an hour admiring perhaps the greatest extent of landscape I had ever seen. No less than twenty-seven lakes were in view at one time, of varying sizes and forms, from the huge Corangamite, covering 57,700 acres, or about 90 square miles, of which I could see the whole extent, down to sheets of water only a few acres in extent. Several townships, such as Colac, Warrion, Beeac, and Ondit, lay at my feet, and, with almost the whole country in a high state of cultivation, the scene was one to be remembered. To the east my view extended to the You Yangs (55 miles), round to Buninyong, the Ballarat plateau, and Mount Cole, at Beaufort, on the north. Another volcanic peak stood up a little to the right of Buninyong, which most people say is Warrenheip; but, according to the maps, this cannot be, for Warrenheip should be in a direct line behind Buninyong from the Warrions. I take the mount to be Mount Egerton, near Ballan, or perhaps the Blue Mountain, near Trentham. Unfortunately, a rain squall was working up from the south-west, so that I could only just make out Mount Leura at Camperdown: but, had that side of the panorama been as clear as the eastern, I would doubtless have seen Mount Noorat, near Terang. The south-eastern face of the range is rather steep, but I managed to work down through the bracken to the lower levels, and then made my way towards the Little Warrion,

passing one or two hollows, very significant of volcanic action. From the Little Warrion I could look down into Lake Coragulac, which was invisible from the other hill, and, as I mentioned before, from the road. Rain was now fast approaching, and as it approached my intention of visiting "Red Rock" became more hopeless. By the time I reached the little township—one store and the post-office—a regular deluge was falling. Fortunately, the store had a good verandah, which proved my shelter for over an hour, till, just as the rain had almost ceased, my friend of the morning came by again, and I accepted his offer to drive me back to Colac; so the claims of Red Rock as a vantage-point still remain to me unknown. Before dark set in I ran up to the Gardens again to view once more, across the lake, the hills on which I had spent such a pleasant hour, and later caught the evening train for Terang, 42 miles further west, intending to walk back to Camperdown on the Sunday. Nothing could be seen on the journey. Terang was reached about 11 p.m., and lodging secured for the night.

I was out betimes in the morning, but a heavy fog prevented anything more than one's immediate surroundings being seen. However, the position of the lake and public gardens, occupying one side of the main street, was located. After breakfast I started off along a road leading southwards, to visit the cemetery. Cemeteries in country places are generally good places for botany, as usually no grazing takes place in them. The cemetery is situated on the opposite side of the lake to the town, and has a gentle slope to the south, with an abrupt slope northwards to the lake. The fog was now lifting, and when I reached the highest part of the cemetery I received a great surprise, for I had quite forgotten about Mount Noorat being in the vicinity, as, owing to the fog, I had not seen the slightest indication of it; but as I reached the higher ground the view of it came upon me quite suddenly, and seemingly close at hand, though four miles away. Mount Noorat has one of the most perfect craters of the Western District, and rises some 500 feet above the plain. I found the lake to be losing much of its character as a lake, and becoming a mere weedy swamp —a good place for the pond-hunter, perhaps, but both dangerous and difficult to work. The residents say it has been gradually drying up for years, and is not the result of artificial drainage. I was pleased that I had visited the cemetery, for here I saw, besides the tomb of the late Hon Neil Black, the pioneer of the district, the grandest display of lichens I have ever seen. Here they were—green, grey, yellow, orange—in the greatest profusion, and, judging by the dates on one of the tombstones, it had been fairly covered in less than seventeen years. The

kind of stone seemed to make no difference. They grew alike on basalt, granite, marble, and sandstone, both polished and unpolished. There must be some atmospheric influence from the lake which is favourable to their growth, just as at the Warrion, overlooking Lake Colac. Mount Shadwell, at Mortlake, Mount Warrnambool, and other hills were also visible from the cemetery.

It was now time to get back to the town and make a start on my thirteen-mile walk to Camperdown, before reaching which I hoped to visit Lakes Gnotuk and Bullen-Merri, which lie to the west of the town. Again I was lucky in getting a lift for a few miles, and had some of the local history told to me. Noorat House, surrounded by pine trees, could be seen sheltering under the shadow of the mount. Our road was a fine sample of the celebrated Western District roads—good, because they have such an abundance of road-making material. Presently we came to the Mount Emu Creek, which, having such a long course of 120 miles from near Burrumbeet, and a fair volume of water, is quite worthy of the term of river. Crossing this, we were passing through the famous Marida Yallock station, and saw some of the black Angus cattle which are Mr. Mackinnon's pride. Here, along the boundary of the estate, were seen signs of that tree-planting which is helping to re-clothe the western plains. It will hardly be credited that, when the first store was built in Terang, some fifty years ago, the trees were so close together between it and Camperdown that the enterprising storekeeper marked his road from Camperdown by pieces of red material attached to the trees! Now the paddocks are almost treeless. How many thousands of tons of timber must have been burned as a useless encumbrance of the ground to make room for the squatter's flocks and herds!

The situation of Lakes Gnotuk and Bullen-Merri is unique. Soon after crossing the Mount Emu Creek my friend pointed out some pine trees along a ridge, and said, "Make for them; the lakes are just below." The road was fairly level for several miles—here and there a slight rise, and a corresponding depression. Presently I saw the track of the Timboon railway along the hillside, and, inquiring again as to the direction, was told to make for a bridge under the line, over a road leading up the hill. This I followed, and soon reached the summit of the ridge, which is probably some four or five hundred feet above the general level of the country. The road, I found, led directly to the isthmus (if it may be so called) between the two lakes.

What a scene presented itself to me! I had been misled

by the wretched picture in Gregory's "Geography" to expect two ordinary sheets of water in fairly level country; but here I was looking down into what might be termed an immense quarry-hole full of water. This was Bullen-Merri. I did not even comprehend its size until I returned home and looked up the records in the "Victorian Year-Book." Suffice it to say the lake covers 1,330 acres—almost as large as the Yan Yean—with sides varying from fifty to four hundred feet high, consequently the limited expanse which it seems to cover. Gnotuk lies directly to the north, and is much smaller, and with banks not quite so precipitous. Both lakes are within the same encircling ridge, being separated from one another by the very much lower isthmus.

Fortunately I met, on the bank on which I was sitting, perhaps 150 feet above the level of the water, a local resident, who came to my aid, and pointed out the surrounding squatting stations, lakes, &c., for the outlook here was grand in the extreme. The afternoon was as fine as one could wish for, and I fairly revelled in the sight presented all round. Mounts Noorat, Shadwell, Elephant, the Cloven Hills, with Lake Colongulac (a large, shallow depression, where, years ago, remains of the marsupial lion were found) in the foreground, were readily distinguished, as also Mount Fyans, with its pine plantations; but, besides these, I could easily make out Mounts Sturgeon and Abrupt, at Dunkeld, some 75 miles away, Mount William (the highest peak of the Grampians), Mount Cole, Buninyong, and the mount I mentioned before, which I take to be the Blue Mountain at Trentham. Leura, though close at hand, was hidden by the hill forming the opposite side of the chasm.

These lakes and the district around were recently fully dealt with in a geological survey report—"The Geology of the Camperdown and Mount Elephant Districts," by H. J. Grayson and D. J. Mahony, M.Sc., F.G.S., which is extremely interesting and exhaustive. Their conclusions are different to the generally accepted reasons for the existence of the lakes. The popular idea is that they are craters of extinct volcanoes, and the late Dr. J. E. Taylor, the well-known science lecturer, who visited Australia in 1885, and published, as the result of his travels, that interesting little book, "Our Island Continent," says:—"I did not meet with anything more scientifically interesting in Australia than the crater-lakes of Western Victoria. . . . Let us first take the two crater-lakes of Bullen-Merri and Gnotuk." Some years ago Mr. T. S. Hart, M.A., in a paper read before this Club on Tower Hill and Lake, near Koroit (*Vict. Nat.*, xvii., 1901, p. 159), advanced the theory

that it had been caused by an explosion, and not a subsidence of the floor, as others had considered. Now Messrs. Grayson and Mahony have come to the same conclusion as regards Gnotuk and Bullen-Merri: but, whatever the cause, the result is most interesting, and well worth making an effort to see, and I trust these notes will induce others to try Western Victoria for a holiday.

But I have not told you all the curious features of these two lakes. Time was getting on, so, under the guidance of my friend, I descended the hillside to the place where there is an outcrop of fossiliferous material, consisting of marine shells. This has been fully dealt with in the report mentioned. In doing so I missed the exposure of volcanic tuffs in the road-cutting near by. This formation underlies a great extent of country hereabouts, comprised in the county of Hampden, and has, in consequence, been named the Hampden tuffs. Continuing on to the edge of the lake, I tasted the water, and found it fairly fresh, with no sign of algæ on the stones near the water-line. These have a whitened appearance, but from what cause I am unable to say. The surface of the lake is lower than formerly, and, like Terang, is said to be gradually drying up: but it will take many years to make any appreciable difference, as it is upwards of 250 feet deep. I then crossed the neck of land separating the two lakes, which, from my previous observation spot, seemed only a couple of hundred yards or so across. I found it nearer half a mile, with a fall of about 200 feet in that distance to Gnotuk. Professor Gregory speaks of Bullen-Merri having an outlet; but it is not an outlet in the ordinary sense of the word, as the lowest portion of the isthmus is nearly fifty feet above the level of the water in the lake. There is, however, a certain amount of soakage through to Gnotuk. Gnotuk is weird in the extreme, surrounded by steep banks and fringed with dead or dying trees. It is much smaller than Bullen-Merri, its area being only 600 acres, while it is nearly circular, having a diameter of about a mile, with a depth of about 110 feet. The greater part of the shore-line of both lakes is, unfortunately, private property. The water of Gnotuk was not nearly so clear as that of Bullen-Merri, and, though quite salt, supported a considerable growth of algæ, which washed up on to the stones along the shore, and then, drying, gave them a very dirty, unsightly appearance. A small flat exists on portion of the shore which is cultivated, and there are a number of windmills distributed round, which, strange as it may appear, raise fresh or comparatively fresh water, suitable for watering stock, irrigating, &c. The difference in the water-level of the two

lakes is 163 feet, the level of Bullen-Merri being 18 feet below Camperdown railway station.

It was now time to make for Camperdown, and I ascended the steep roadway from the isthmus to the public gardens. A squall arose on Bullen-Merri, and soon waves were beating on the shore, creating quite a surf. In the road-cutting may be seen further exposures of the Hampden tuffs. A neat shelter for picnickers is placed in a good position on the isthmus, and there is another in the recreation reserve, while from a pavilion and look-out in the gardens proper a good idea of the whole scene can be obtained, though to some extent marred by the growth of the Californian pines growing around. I think the approach from the western side—the one I had fortunately adopted—gives by far the most imposing view of this remarkable scene.

From the eastern slope of the hill the town of Camperdown lay several hundred feet below me, with Mount Leura (1,030 feet) and its crater guarding it on the south-east. It was quite dark by the time I reached the hotel, so nothing more could be done that evening but make inquiries and fix up a plan for the morrow (Easter Monday), my intention being to walk through a portion, at least, of the Stony Rises—another remarkable feature of this portion of Victoria.

As it was necessary to get the early train towards town, I had only time to do a rapid survey round the base of Mount Leura before breakfast, leaving the investigation of that curious landmark for some future time.

Soon after leaving Camperdown stone walls begin to appear, and at Weerite (6 miles) the fringe of the stony country is touched. At the next station, Pomborneit, some huge masses of piled-up basalt occur close to the railway station, while Lake Purrumbete, a beautiful sheet of fresh water, lies a few miles to the south. Presently Mount Porndon comes into view on the same side—a high cone, apparently, of loose blocks of porous lava, rising, perhaps, 500 feet above the plain, and dotted with trees of various kinds. I had been advised to alight at Stonyford, the next station, and commence my walk through the Rises, which extend as far as the Pirron Yallock Creek, a distance of about seven miles. I was soon charmed with the picturesqueness of the scene, but find it difficult to put on paper an adequate description of this peculiar tract of country

One of the first writers to put into print his impressions of the Stony Rises was James Bonwick, who, in 1858, under the title of "Western Victoria: its Geography, Geology, and Social Condition," published an account of a tour made through

Western Victoria in 1857 as an Inspector of Schools. Though containing several inaccuracies, it is worth reading, and from it one can learn the progress made by the various townships in the fifty years' interval. He was no mean geologist, a keen observer of Nature, and remarks on the Rises as follows :— "The Rises are a remarkable geological feature. The basalt, instead of being spread out, as on the plains, or massive, as in mountains, is here reared up as waves petrified in their rise. Huge barriers meet the eye on all sides, of heights from ten to sixty feet, and the traveller has to thread his way between them or over them as best he can. Dieffenbach rightly describes a similar place in New Zealand as 'a sea of rocks.' . . . Darwin compares a similar scene he beheld to a sea petrified in a storm ; but he adds, 'No sea could present such irregular undulations, or could be traversed by such deep chasms.'"

It was Dr. J. G. Taylor's remarks in "Our Island Continent" which had set me longing to traverse the Rises. He says :— "The Stony Rises are remarkably picturesque, and furnish bits for a genuine artistic study of Nature. The huge stones are covered with a rich upholstering of lichens—grey, yellow, and red. The miniature swamps and hollows are margined by borders of emerald-green mosses. The grey stony places are frequently masked with the abundant growth of bracken ferns, from amid which the weird white trunks of slender gum-trees rise, drooping over them their characteristic thin foliage.' This description might still be amplified. I imagined I could see in the grey piles of stones, and the pools at their bases, the walls of some mediæval castle and its surrounding moat, and expected to meet a party of mail-coated knights round the next turn ; for, except one stretch of about a quarter of a mile, the whole seven miles of the road between Stonyford and Pirron Yallock was a real "switchback"—up and down, turning first one way, then the other, so that one's interest was maintained to the last, and I felt quite sorry when I came to the Pirron Yallock Creek, a stream of brown, peaty water, flowing north from some marshy country into Corangamite, and found that I had left the basalt behind. Traversing the road in the autumn, wild flowers were few, but the varying tints of the bracken—green, brown, and golden—made up for their absence. In spring several Senecios and other composites would enliven the scene. A casual glance among the stones revealed plants of the Maiden-hair, Sickle, and Rat-tailed Ferns, while, doubtless, the little pools would have afforded many captures to a pond-hunter. Even though the Rises are now fairly occupied by small dairy farmers, and much of the larger timber has been

cut down, they must retain their principal characteristics for many a day, and I can thoroughly recommend anyone wanting an outing of a totally different character to anything about Melbourne to walk through from Pirron Yallock to Pomborneit, or *vice versa*, either in spring or autumn, and by all means to take a camera with them.

My tour was finished by walking on to Colac, about 9 miles further, and having another look at the Warrions across the lake before catching the evening train for Melbourne. The holiday was one containing so much novelty, and sights so different from what I expected, that I hope at no distant date to renew my acquaintance with this interesting district.

THE PRESERVATION OF SPECIMENS.—How to save one's collections from the depredations of insect foes is alike the worry of the entomologist and the botanist, &c. In a lecture given at the February meeting of the New South Wales Naturalists' Club, and recorded in the *Australian Naturalist* for April, Mr. T. Steel, F.L.S., relates his experiences in attempting to keep natural history specimens unharmed. He states that naphthaline and corrosive sublimate dissolved in spirits are both unsatisfactory, and that he finds, after many trials, that a saturated solution of white arsenic in methylated spirits gives the best results. Specimens in cabinet drawers may be poisoned by means of a drop tube. Care should be taken of the solution, and articles used for its manipulation, as it is highly poisonous. Collectors adopting this suggestion might report results in the course of a few months.

"THE AQUARIUM IN AUSTRALIA."—The first number (July, 1911) has reached us of *The Aquarium in Australia*. It is published by the Aquarium Society of New South Wales, and edited by Mr. D. G. Stead, Naturalist to the Board of Fisheries of New South Wales. The Aquarium Society has now been in existence for some four years, and naturally desires to record its doings and experiences. The society is not confined to the study of fish, as might at first be supposed, but interests itself in all forms of aquatic life belonging to either fresh or salt water. The number under notice contains an interesting article by Mr. R. J. Tillyard, M.A., F.E.S., on "The Dragon-Flies of Australia."

THE NATIONAL PARK, WILSON'S PROMONTORY.

The second annual report of the committee of management of the National Park, Wilson's Promontory, recently issued, shows that, notwithstanding the limited funds at its disposal, a fair amount of progress has been made during the year. It is gratifying to know that the vermin-proof fence across the isthmus has, after many delays, been at length completed, and the danger of the ingress of rabbits, foxes, or other pests has thus been greatly minimized, while at the same time the animals, &c., introduced into the park will be prevented from escaping. The Emus were a considerable source of trouble, as, the Darby River proving no obstacle to them, they would swim across as easily as ducks, so as to be in the company of horses grazing outside the park. The following birds and animals have been introduced into the park :—Emus, 6 ; Lyre-birds, 3 ; Satin Bower-birds, 5 ; Grey Kangaroos, 2 ; Red-necked Wallabies, 2, and Rufous-bellied Wallabies, 19 (from Flinders Island, Bass Strait) ; Wombats, 5 ; Opossums, 26 ; and Gunn's Bandicoots, 2. Very many more varieties are desired, and the committee will be glad of further donations. Seeds of several species of native trees have been sown, and the Forests Department has planted a large number of native and exotic trees on the portion reserved for it. New bridle tracks are being made, which will open up inaccessible portions of the park, which has an area of about 101,000 acres, or nearly 160 square miles.

The Field Naturalists' Club, it will be remembered, took an active part in securing the reservation of Wilson's Promontory as a National Park, and it may not be out of place to record some of the principal references to it occurring in the *Victorian Naturalist*. The history of the movement was dealt with by Dr. Hall in January, 1905 (vol. xxi., p. 128), and the report of the F.N.C. camp-out at Christmas, 1905, was published, with a map, in vol. xxii., p. 191. Three botanical surveys have been made by the National Herbarium, which have resulted in the compilation of a flora of 600 species of native flowering plants and ferns, with about 50 naturalized aliens. These will also be found in the *Naturalist*, vol. xxv., p. 142 (with revised map) ; xxvi., p. 129 ; and xxvii., pp. 178 and 208.

The Australian Waratahs.—In the *Australasian* of Saturday, 2nd December, Prof. Stirling, of Adelaide, relates his experiences of growing the New South Wales, Victorian, and Tasmanian species of Telopea in his garden near the Mt. Lofty Station, where they are all doing well and flowering.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th December, 1911.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the whole-day excursion to Healesville on Saturday, 25th November, was forwarded by Mr. R. Kelly, one of the leaders, who said that eight members had gone from town, and had been joined at Healesville by the leaders and two or three friends. It was decided to visit the Myers Creek and Falls, which proved an excellent botanical collecting-ground, but the entomologists were very poorly rewarded. The feature of the outing was the floral display made by *Prostanthera melissifolia*, which, though a little past its best, was good enough to excite the admiration of the whole party. Some notes were added of an extension of the excursion to Mount St. Leonard on the following day, and Mr. E. B. Nicholls contributed a list of the birds seen.

A report of the excursion to Fairfield on Saturday, 9th December, was given by the leader, Mr. J. Searle, who reported a rather small attendance of members. The pools visited were found to be in good condition, and a number of interesting specimens of pond-life were taken.

A report of the junior excursion to Hampton on Saturday, 2nd December, was forwarded by the leader, Miss J. Raff, M.Sc., who reported an interesting afternoon spent in the study of shore-life.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. C. E. Isaac, State school, Coburg, and Mr. Atherstone O. Archer, Trinity College Hostel, Parkville, were duly elected members of the Club.

PAPERS READ.

1. By Mr. J. Searle, entitled "Some New Victorian Copepoda."

The author briefly referred to the mode of occurrence and the distinguishing characters of three undescribed species of fresh-water crustaceans belonging to the order Copepoda. These he named *Brunella longicornis*, *Boeckella nyoraensis*, and

B. pseudochelæ. The last-named species has been taken in several localities, but the others are at present known only from the Nyora district. The paper was illustrated by specimens and enlarged drawings.

Dr. T. S. Hall, M.A., said that the author should be congratulated on the work he is doing in this group, and referred specially to the value of the detailed drawings exhibited.

2. By Mr. P. R. H. St. John, entitled, "A Trip through Croajingolong."

The author described a series of lantern slides taken by members of the Melbourne Amateur Walking and Touring Club during a visit to East Gippsland in the Christmas vacation of 1910, when he formed one of the party. The route taken was pointed out on the map by Mr. W. E. Briggs, president of the club, and may be briefly summarized as starting from Orbost, on the Snowy River, following the Genoa road as far as the Thurra River, then southwards to Cape Everard, a visit to the Mueller River (a few miles to the east), then the return journey along the coast to Marlo, at the mouth of the Snowy River. The author pointed out the characteristic trees and shrubs occurring in the pictures, and gave considerable information as to the vegetation of the district, which is very different to that of Central and Western Gippsland. The district was remarkable for the variety and value of the eucalypts.

In reply to a question, by Mr. Hardy, he said that in speaking of the Mountain Ash and Blackbutt he referred to *Eucalyptus Sieberiana* and *E. pilularis* respectively.

Mr. J. Searle said that, notwithstanding the difficulties mentioned by the author, they were light compared with those experienced by the excursion party from the Club when it traversed portion of the same route at Christmas, 1888. Then few tracks existed, and the country was practically uninhabited.

Mr. J. Shephard and Mr. J. Gabriel remarked on the interesting nature of the author's descriptions.

Mr. A. D. Hardy gave some information as to the operations of the present *Forests Act*, which should result in much greater care being taken of the forests, and their general improvement from an economic point of view.

The chairman said that it was gratifying to learn that steps were being taken to check the appalling waste of valuable timber which had been going on for so many years.

EXHIBITS.

By Mr. F. G. A. Barnard.—Dacite from summit of Mount St. Leonard, 3,304 feet above sea level: abnormal form (growing) of Sickle Fern, *Pteris falcata*, from Stony Rises, near Pirron Yallock.

By Mr. C. J. Gabriel.—Rare Victorian mutton-fish shell: *Haliotis conicopora*, Peron, from Flinders, with the commoner species, *H. nævosa*, Martyn, for comparison.

By Dr. T. S. Hall, M.A.—A gigantic fossil echinoid, *Linthia mooraboolensis*, Pritchard, from Batesford, near Geelong.

By Mr. J. Searle.—Drawings of new species of Copepoda, in illustration of paper: also living specimens of Boeckella, Daphnia, &c.

After the usual conversazione the meeting terminated.

EXCURSION TO FAIRFIELD.

The selection of Fairfield for a pond-life excursion for Saturday, 9th December, was evidently not popular with the dozen or so enthusiasts who usually attend such excursions, for only three members accompanied the leader on that day. We had, however, a very pleasant afternoon, and succeeded in recording a very fair variety of pond-dwellers. Taking train to Alphington, we proceeded along Yarra-street towards the river, visiting several ponds on that side of the stream, and then, crossing by the Outer Circle railway bridge, continued our investigations on the Kew side. The ponds were found to be in good condition, and aquatic life (including insect larvæ) very plentiful. Entomostraca were very numerous, while some fine clusters of the rotifer Megalotrochus were taken from the branches of Nitella and other pond weeds. Colonies of Vorticella, of enormous size, were common, and a few specimens of the blind isopod, *Janirella pusilla*, and the amphipod, Chiltonia, were taken. In addition, the following species have been identified: —Crustacea.—*Daphnia carinata* (very numerous), *Scmocephalus gibbosus*, *Monia*, sp., *Cypridopsis*, sp., *Boeckella symmetrica*, *B. minuta*, *B. oblonga*, *Cyclops leuckarti*, *C. albidus*, and *Attheyella australica*. Rotifera.—*Megalotrochus albo-flavicans*, *Hydratina senta*, *Brachionus*, sp., and what was thought to be *Pedalion mirum*, owing to its erratic mode of progressing through the water; but on reaching home the specimen could not be found, so its identification is doubtful. Hydra were not numerous, but two species of Hydrachnia were noted. Planarians were very numerous, and a few Mollusca were also secured.—J. Searle.

Nature Notes.—The weekly page of "Nature Notes" in *Every Saturday* (Melbourne) appears to maintain its popularity. The information is nearly always of a useful character, and, being illustrated, though sometimes rather roughly, is all the more valuable and easily understood. Those lovely native shrubs, the prostantheras, or mint-bushes, were dealt with last week, and their cultivation in our gardens urged.

BOTANICAL GLEANINGS ON A TRIP TO THE OMEO DISTRICT.

By J. W. AUDAS, F.L.S., Assistant, National Herbarium, Melbourne.

Read before the Field Naturalists' Club of Victoria, 13th Nov., 1911.

ABOUT twelve months ago I spent a delightful holiday in East Gippsland (*Vict. Nat.*, xxvii., 1911, p. 164), and was so enamoured of the country for botanical research that I decided to seek among its beauties for further specimens, and started from Melbourne by an early train on Monday, the 9th of October last. The season was well advanced, and familiar floral friends greeted my view from the carriage window as we sped along. The Blue-bell, *Wahlenbergia gracilis*, seemed to reflect and intensify the glorious cœrulean of the October sky, while the Buttercup, *Ranunculus lappaceus*, and Erect Marsh-flower, *Villarsia reniformis*, gleamed golden from the swamps. Everywhere *Bulbine bulbosa*, *Craspedia Richea*, *Burchardia umbellata*, *Pimelea humilis*, *Dillwynia cinerascens*, *Arthropodium strictum*, and the orchid *Diuris pedunculata*, were blooming profusely.

Between Fulham and Sale a delightful surprise was in store for me, the whole surface of the ground for long distances being completely covered by an exceptional and almost exclusive growth of two plants — *Ajuga australis* (commonly called Bugle) and the everlasting *Helichrysum apiculatum*—whose complementary colours, deep violet and pale canary, were beautifully intermixed.

A few hours' delay at Sale gave me an opportunity of making some observations. I found that the town boasts an artesian spring, round which a beautiful fountain has been built, and its waters (whose medicinal properties are claimed to be equal to those of any imported mineral waters) are used in the thoroughly up-to-date public baths, while the overflow has been used to transfer an unsightly swamp into a large and beautiful lake, on which pelicans, swans, and other birds live in unmolested content.

The river banks near the junction of the Glengarry and Thomson Rivers are lined by Red Gums, *Eucalyptus rostrata*, and Black Wattles, *Acacia decurrens*. Many of the latter attain a height of 90 feet, being the tallest of this species that I have ever noted, and they were badly infested, and many destroyed, by the mistletoe *Loranthus pendulus*, and also the lichen *Ramalina Eckloni*, var. *membranacea*, which encircled the trunks and limbs to the tops of the branches.

It is a matter of varied opinion among botanists whether

the lichen should be classified as a parasite, its effect upon the host being of such an injurious nature as to give weight to the theory that it is parasitical ; but, on the other hand, it is possible that the acids which are known to be present in the thallus of most species of lichens may have the injurious effect usually noted on the bark of plants, and, moreover, the fungus *Peniophora albo-marginata*, which was intermixed with the lichen, may have hastened the plants' death, as several of the Thelephoraceæ are known to have caused that effect : but these theories would require further investigation before any definite decision could be arrived at.

The Swamp Paper-bark, *Melaleuca cricifolia*, was blooming profusely all along the banks, and I was somewhat surprised to see the mistletoe *Loranthus pendulus* flourishing on many of these shrubs. The latter parasite I have seen during my wanderings upon many varieties of plants, but it was the first occasion upon which I had seen it on this species. Many other pretty shrubs were in bloom, including Hemp-bush, *Plagianthus pulchellus*, Blueberry-tree, *Myoporum insulare*, Prickly Box, *Bursaria spinosa*, Blackwood, *Acacia melanoxylon*, Christmas-bush, *Prostanthera lasianthos*, and the air was rendered fragrant by the perfume of the Tree Violet, *Hymenanthera Banksii*.

The inspector of noxious weeds for the district might well direct some attention to this part, for the pests Blackberry, *Rubus fruticosus*, and Spotted Thistle, *Carduus* (*Silybum*) *Marianus*, were both flourishing profusely in the rich black soil, the latter being in flower. Its large pink heads, held on stalks some six feet in height, were propagating a great quantity of seeds for the future spread of this alien.

Between Munro and Fernbank wild-flowers in countless varieties flourished in the sandy soil. Every shade ever mixed upon the palette of an artist was repeated in some beauteous floral form, among which were *Ricinocarpus pinifolius* (white), *Tetratheca ciliata* (pink), *Indigofera australis* (purple), *Chamæscilla corymbosa* (sky-blue), and *Hibbertia diffusa* (golden). The flowers of the latter were abnormally large, and the petals took a peculiar curling form, which made the blooms appear double.

As I had spent some time botanizing round Bairnsdale at the same period of the year twelve months before, I decided to push on, and started by coach for Bruthen at 4 p.m. the following day. I might mention, in passing, that all the coaches on this line are built locally to a minimum weight of one ton, and on the pattern used in America 75 years ago, than which nothing better is known for use on rough roads.

The route was familiar to me, and I found myself looking

eagerly ahead to greet some well-known plants. At Sarsfield the Prostanthera, which last year had covered acres of ground in vivid purple, had passed its first glory, and there were now only a few browning branches; but further on the Red Box, *Eucalyptus polyanthemos*, and Peppermint, *E. amygdalina*, were covered with blooms, on which hundreds of Musky Parrakeets, *Trichoglossus concinnus*, were feeding greedily. In a shady glen wooded by *Acacia discolor*, *Leptospermum scoparium*, and *Cassinia aculeata*, the musical note of the Bell-birds or Bell-miners, *Manorhina melanophrys*, rang out with remarkable clearness, and was inexpressibly sweet to hear. These birds are met with only in certain parts, as they seem to select a locality, generally secluded, and take up their abode, never to move away, so that one may always know where they will be heard cooing their sweet notes.

I observed in many places on the hills that *Acacia oxycedrus* reached a height of some 15 feet. This is sufficiently unusual to be remarkable, as this shrub, seen in its native element upon the sea-coasts, rarely attains a height of more than two to three feet, and is of somewhat procumbent habit, whereas the specimens growing among these hills shot up erectly and were of tree-like growth. *Daviesia corymbosa* grew gregariously and to the unusual height of eight to ten feet, extending in orange-yellow patches to the tops of the hills. *Pultenæa stricta*, var. *Gunnii*, was here (as often noted in other parts) infested by the mite, whose depredations restrict the growth of the foliage so that it frequently forms into a ball, from which the young shoots branch forth whenever they remain sufficiently long unmolested by the mite, and form the peculiar growth known as the "witch's broom." This insect, which is a pest recently intruding in Victoria, has not yet been named by the Government Entomologist, and seems to be identical with one which I observed particularly destructive to all the eucalypts in the district round Dandenong and Beaconsfield when passing through there in September last.

Near Bruthen, where the land had been recently cleared or had been swept by a bush fire, the Black Wattle, *Acacia decurrens*, had sprung up thickly, taking complete possession of the ground, which here, as throughout the Tambo valley, is of remarkable richness, and I have been informed that pear and apple trees grown on it have attained a circumference of over seven feet, while all citrus fruits thrive wonderfully. The Spreading Acacia, *Acacia diffusa*, was blooming on the hills, and its flowers were of such abundant richness as to almost obscure the phyllodes; but, although it excited admiration on the bush, one would find it rather prickly to handle. *Xanthorrhœa*

australis, known as Bayonet-grass or Grass-tree, but which is not a true grass, as it belongs to the Liliaceæ, was very abundant. The base of the leaves of this plant are very succulent, and formed the sole nourishment of a little girl who was recently lost in the bush for several days. Of the *Panax sambucifolius* there were many specimens, but they varied greatly in foliage, although all belonged to the one species. Some were handsome shrubs of fifteen feet in height, whose wood (called Mountain Ash), is highly esteemed by bushmen, who use it for axe handles. It is prettily marked, sound, and pliable.

From Bruthen to Omeo is a distance of about 70 miles, and we started for the first coach stage at Double Bridges at 4 a.m. There had been a heavy fall of rain overnight, which made the generally bad road very much worse, so that the four stalwart horses had all their work to do in pulling the coach up the steep road, which for about 40 miles is hewn out of the rocky cliffs rising sheer from the river, so that it appeared like a narrow ribbon winding ever upwards on the hillsides, with a sheer drop of many hundreds of feet into the river, whose waters, swollen by the recent rains, raged their torrentous course over large granite and limestone boulders below.

The ordinary tourist is wont to gasp with horror on being told that this is the road he must travel, but after a few miles the terrifying thought wears off, and he can look downwards without feeling dizzy. The first few miles were wooded by Gum-topped Box, *Eucalyptus hemiphloia*, var. *albens*, Red Ironbark, *Eucalyptus sideroxylon*, White Stringybark, *E. eugenioides*, Yellow Box, *E. melliodora*, Mountain Gum, *E. goniocalyx*, Red Box, *E. polyanthemos*, Peppermint, *E. amygdalina*, Grey Box, *E. elæophora*, Mountain Ash, *E. regnans*, Messmate, *E. obliqua*, Stringybark, *E. macrorrhyncha*, which latter species grew thickly and in an almost uniform circumference of about five feet, shooting up their sheer perpendicular trunks to a height of 50 feet before branching.

A very gorgeous effect was produced by the scarlet flowers of the Red Climber, *Kennedya rubicunda*, clambering thickly over all the vegetation, entwining the lower branches of Eucalypt saplings and almost completely covering them with racemes of bright red flowers. It was exceptionally prolific, and, although keenly alert, I was not fortunate enough to find a white-flowering specimen of this plant; but I have been informed that it is occasionally met with there, and is fairly common around Dargo. Growing upon the sidings were many shrubs of *Dodonæa viscosa*, var. *attenuata*, which might be mistaken for *Acacia retinodes*, to which it bears a striking resemblance in bark and leaf; but it can easily be distinguished

by examining the foliage, which are true leaves, while those of the acacia mentioned are phyllodes. *Casuarina suberosa*, *Eriostemon trachyphyllus*, *Leptospermum pubescens*, *Melaleuca squarrosa*, *Hakea eriantha*, *Lomatia longifolia*, and Kanuka, *Tristania laurina*, are found along the whole course of the river, growing close to the water's edge. The timber of the latter is sometimes called "Australian fiddleback." It is very beautifully marked, and can be highly polished.

At Double Bridges, Snow-bush, *Olearia* (*Aster*) *stellulata*, and Sandfly-bush, *Zieria Smithii*, were in full bloom and lined the watercourses, accompanied by Hazel, *Pomaderris apetala*, and also its relatives, *P. elliptica* and *P. vaccinifolia*. Two pretty flowering shrubs, Christmas-bush, *Prostanthera lasianthos*, and Four-cornered Haircup, *Calythrix tetragona*, were observed near the water's edge. The former has sweetly-scented leaves, and blooms profusely for fully three months of the year. It should, if cultivated, soon become a great favourite in gardens as an ornamental tree, for it here attains a height of fifteen feet, and should do so elsewhere in favourably situated localities. I once observed it forming a beautiful hedge covered in snowy blooms at Sassafras. The latter, though a much smaller shrub, also deserves to take a high place among ornamental plants.

The most interesting portion of the route, from a botanical point of view, lies between Double Bridges and Tambo Crossing. Along here, due to the courtesy of an obliging coach-driver, I was able to descend and gather many specimens on the precipitous banks descending to the river. The principal of these were the Juniper Wattle, *Acacia juniperina*, Mountain Pepper, *Drimys aromatica*, Nodding Blue Lily, *Stypandra glauca*, Austral Myosotis, *Myosotis australis*, Large-leaved Coprosma, *Coprosma hirtella*, Slender Tea-tree, *Leptospermum attenuatum*, Tough Rice-flower, *Pimelea axiflora*, Crimson Bottle-brush, *Callistemon lanceolatus*, and Cockspur-flower, *Plectranthus parviflorus*. The latter is largely cultivated as a pot plant and in gardens, but is rarely met with in its native state, and was here growing in abundant masses. The Alpine Grevillea, *Grevillea alpina*, and Golden Grevillea *G. floribunda*, were both covered with their curling clusters of crimson and yellow flowers, while a sombre note was added by the rusty tomentum of the young foliage of the Scrubby Velvet-bush, *Lasiopetalum dasyphyllum*. On the whole length of the journey I only noted one shrub of the Spice-bush, *Cassia australis*, which was blooming beautifully right on the edge of the river, and I had a rather difficult climb over loose granite boulders down the steep bank to secure it. This is another of our native plants deserving cultivation, for one could not wish for a prettier sight than is presented by the

luxuriance of its golden flowers, held on peduncles slightly shorter than the leaves, when in full bloom.

Climbers and twiners ran riot, vying with each other for pride of place. The long, glossy leaves of the Beaked Marsdenia, *Marsdenia rostrata*, *Tecoma australis*, var. *Latrobei*, and the cord-like growth of the Wombat Berry, *Eustrephus Brownii*, Appleberry, *Billardiera scandens*, two species of clematis—*C. microphylla* and *C. aristata*—and the parasite, *Cassytha melantha*, almost smothered the other vegetation. Among the smaller plants nestling on the banks were *Stellaria multiflora*, *S. pungens*, *Oxalis corniculata*, *Bauera rubioides*, *Helichrysum lucidum*, *H. semipapposum*, *Platylobium formosum*, *Siegesbeckia orientalis*, *Brachycome diversifolia*, *Viola hederacea*, *Veronica Derwentia*, *Opercularia varia*, *Galium australe*, *Cygnoglossum australe*, *Poranthera microphylla*, *Stackhousia linarifolia*, *Pelargonium australe*, and all the hollows and crevices of the rocks were occupied by the Rock Fern, *Notholæna* (*Cheilanthes*) *tenuifolia*. The shrubs comprised the Round-leaved Lilac, *Prostanthera rotundifolia*, Myrtle-leaved Acacia, *Acacia myrtifolia*, Prickly Geebung, *Persoonia juniperina*, Gorse Bitter-Pea, *Daviesia ulicina*, Prickly Bush-Pea, *Pultenæa juniperina*, Large-leaved Bush-Pea, *P. daphnoides*, Narrow-leaved Geebung, *Persoonia linearis*, Shrubby Spurge, *Phyllanthus Gunnii*, and Tree Hakea, *Hakea eriantha*, which latter here attains the height of a small tree, and its fruits are locally known as "hickory nuts"; but pride of place must be awarded to the Long-leaved Waxflower, *Eriostemon myoporoides*, which was in gorgeous floral array, and well deserves the attention lately being given to it by nurserymen, as it is a beautiful shrub, having a very long blooming period. Midst all this wealth of vegetation, only one solitary Kurrajong, *Brachychiton populneus*, was observed. The introduced weeds *Verbascum Thapsus* and Spurious Mullein, *V. Blatiaria*, both belonging to the order Scrophulariaceæ, flourished by the roadside, the former in places attaining a height of eight feet.

Shady Creek descends precipitously to join the Tambo, and some few years ago, when the bridge was washed away by floods, all the passengers, mails, and produce for the whole district beyond, and as far up as Glen Wills, had to be taken across in a box suspended on a wire rope for a period of about five weeks. Only those who know the district and nature of its requirements can appreciate the magnitude of this undertaking.

Among the many windings of the road was one known as Shady Cutting, which is so overshadowed by the abrupt hillsides that the sun's rays never reach it during the winter

months; and another leads over what has been called the "Devil's Backbone," and thence through "Hell's Gates." It is interesting to note the variety in the geological formation of the country, which changed within a distance of thirty miles from limestone to sandstone, grey granite, and blue granite, as we ascended. The famous limestone cliffs of the Tambo River are very beautiful, and it is known that they are undermined by caves of considerable size; but, as they have never been properly explored, their nature must remain a matter of conjecture.

At Tambo Crossing there were a great many bushes of the Woolly Bitter-bush, *Adriana tomentosa*, which belongs to the Euphorbiaceæ, a noted poisonous order, and is said to have a deleterious effect on stock. At Doctor's Flat and Swift Creek there was nothing botanically worth recording, but we met with a flock of Gang-Gang Cockatoos, *Callocephalum galeatum*, flying among the trees, and their gorgeous plumage brightened up an otherwise rather dull landscape.

Ensay is the centre of a rich agricultural district. Its verdant hills, some cultivated from base to summit, were seen at their best. Here the river is crossed by a suspension-bridge for foot traffic, raised to a high altitude, in case of floods, but there is no provision for vehicular traffic, and the four coach-horses, well used to the work, plunged boldly in and forded the stream. The windings of the river are so numerous that we forded it again within half a mile, and, in fact, between Ensay and Cassilis it is necessary to cross six rivers in this manner.

The little township of Cassilis lies nestling in a long, narrow valley between hills on either side so high that one wonders if the genial sunlight could ever penetrate its secluded but comfortable-looking homes, whose inhabitants mostly draw their sustenance from the Cassilis Mine, situated two miles further back among the hills. This mine, which, when in full swing, employs about 300 men, has one of the most up-to-date mining plants in the Commonwealth. All the power required for working the machinery of the mine, and also the 20-head battery, is supplied by electricity, which is conveyed 15 miles from the power station on Victoria River, at Cobungra. The quartz from the mine is very highly mineralized, and only a very small percentage of the gold is extracted at the battery, but it is afterwards treated by cyanide at Cassilis and the concentrates sent on by boat to Cockle Creek, near Newcastle, New South Wales, for still further treatment in the smelters. A little beyond Cassilis an outcrop of copper (the only one in the district) was pointed out to me, the ore from which has been treated and found to contain a high percentage of copper;

but unfortunately there is not sufficient of the lode to warrant the opening up of a mine.

From thence we begin the ascent of the Dividing Range, and negotiate what is known as the "Cassilis Gap"—an unbroken and precipitous climb of three miles—till we reach the top of the Alps. This is the division of the watershed, all rivers on the south running into the Gippsland Lakes, and those to the north entering the River Murray. From here the view is sublime, and well worth travelling so far to see. The undulating peaks of the Alps, alternately bathed in sunlight or clouded by shadow, seemed to lie like a carpet beneath the feet, with the thin silver winding of the rivers tracing a pattern upon it, while overhead the sun shone with just a genial warmth from a cœrulean sky, and the rarefied air of the altitude (3,000 feet above sea level) inspired one's senses and made the position truly delightful.

From thence we descend a little and cross the Livingstone River, from which the water supply for the township of Omeo is drawn by a race leaving the river about a mile above the crossing, and up, up again, still climbing round the side of Mount Livingstone, and thence into Omeo, which, like Cassilis, also shelters in a valley 800 feet below, and cannot be seen until one is right upon it. It is a fair-sized town, and one of the oldest in Victoria, having sprung into existence with the discovery of gold at the same time as Ballarat, and is the commercial centre of a very large district; but one would scarcely expect to see such well-stocked business places when one has just travelled over the road on which the produce is transported. All goods must be carted from the wharf at Mossiface either in waggons drawn by teams of eight or more horses or by bullocks, the freight from Melbourne averaging £4 per ton.

The hills are not densely wooded, but there are upon them large quantities of White Gum, *Eucalyptus viminalis*, Snow Gum, *E. pauciflora*, Black Sally, *E. stellulata*, Peppermint, *E. amygdalina*, and Swamp Gum, *E. Gunnii*. I noted that the leaves of many of the seedlings of the Snow Gum, *Eucalyptus pauciflora*, bore a most striking resemblance to the phyllodes of *Acacia penninervis* (known locally as hickory), and, growing as they were side by side, could not be distinguished by a casual observation. The latter was particularly plentiful along the Cassilis Gap, and the bark yields material which can be worked up into the coarser kinds of paper. The steepness of the hills may be gathered from the fact that a company endeavoured to transport timber by means of a shoot, but the hillside was so steep that the logs jumped from the shoot when half-way down, and the attempt failed.

Formerly there was a good deal of mining carried on at Omeo, but, although the district is not by any means worked out, and payable stone in large quantities is known to exist, there is now very little being carried on, for want of capital to develop it. At a sluicing claim many large slabs of petrified wood have been brought to light, and I was fortunate in securing a specimen.

While staying in the town I was privileged to inspect a very interesting collection of minerals owned by Mr. Blackburn, comprising stones from every quarter of the world, and other interesting objects, such as a blackfellow's stone tomahawk, with the gum of the grass-tree adhering the stone to the handle, also specimens of bending stone from India, and huge fossilized fungi. Extensive caves are in existence near Bindi. They are in the possession of the Government, but have not been opened up, and consequently are not visited by many tourists, although well worth seeing.

At Mount Murphy, about 25 miles out, are the famous wolfram mines, and many specimens of ore were shown to me. The veins are very numerous, but of variable width, and are best worked by small parties of men upon the tribute system, as the ore is intermixed with much worthless matter, which requires careful handling to keep it clean, and thus save expense in carting to the battery at Benambra, where it is treated.

The famous high plains of Omeo are situated at Benambra, some 15 miles to the north-east, and the road for the first mile follows the course of the Livingstone River, the banks of which, unlike the Tambo and other Gippsland streams, were not densely vegetated, their sole decoration consisting of English Broom, *Cytisus scoparius*, and a prolific growth of Shore Thistle, *Carduus pycnocephalus*. This exotic thrives vigorously throughout the whole district, in some places growing higher than the fences.

The road then leads up a winding ascent for a distance of six miles, lightly vegetated by isolated shrubs of Daphne Heath, *Brachyloma daphnoides*, Wild Cherry, *Exocarpus cupressiformis*, Prickly Box, *Bursaria spinosa*, and small forms of Snow Gum, *Eucalyptus pauciflora*, Black Sally, *E. stellulata*, White Gum, *E. viminalis*, Candlebark, *E. rubida*, Swamp Gum, *E. Gunnii*, and Peppermint, *E. amygdalina*. The Bidgee Widgee, *Acæna sanguisorbæ*, and Sheep's Burr, *A. ovina*, were both flourishing along the slopes of the hills. The former is of creeping habit, rooting at every joint, and consequently very difficult to eradicate. It is supposed to possess medicinal properties, its leaves having been used by bushmen in brewing a decoction

similar to tea, and taken by them as an astringent medicine. The latter bore its prickly, adhesive burrs, in many cases on stalks fully two feet in height.

The view from the summit is extensive and beautiful. The famous fertile plains of red chocolate soil stretched as far as the eye could reach, with Lake Omeo forming the bottom of a huge basin. Near this lake, which is nine miles in circumference, the soil is of a very fertile, black nature, and the question of draining the lake to reclaim this rich area has met with some discussion, but many regard the lake as a beauty spot more valuable to the district than the land, and there were, at the time of my visit, plenty of Wild Ducks, Black Swans, Cranes, and Plovers in the immediate neighbourhood, so that it should prove specially attractive to tourists in search of sport. By a similar winding descent one reaches the little township of Benambra, which is situated right on the lake. The district right through from Ensay was literally "owned" by rabbits, which evidently gained courage from their numbers. They seemed quite fearless, and as tame as chickens. "Bunny" in these parts is rather fond of variety in colour. I noted some were black, others white or white and yellow, and black and white, while entirely yellow ones were very numerous.

In another direction a road costing some £10,000 has recently been completed connecting Omeo and Glen Wills; but, unfortunately, it does not tap a district of such high agricultural value as surrounds Benambra, as the country which it penetrates is mostly high plains, only suitable for stock-raising, and even this industry is somewhat handicapped by the altitude, where falls of snow are so frequent that cattle, if not removed for the winter months, become snowbound.

One can gather some idea of the disadvantages under which people living at long distances suffer for lack of railway communication when one considers that to complete the journey and return to a railway terminus entails a coach journey of four days and the use of forty-four horses, which distance, if the railway were continued, could be accomplished in about a quarter of the time.

Mineral Springs.—It is gratifying to know that at last the mineral springs of Victoria are to be conserved and their surroundings improved, so that in course of time they will become a very valuable asset to the State. The nearest to Melbourne appears to be one at Donnybrook, on the North-Eastern line, about twenty-one miles from town. This might form an object for a club excursion some day.

NOTE ON THE WHITE-HEADED STILT, *HIMANTOPUS LEUCOCEPHALUS*, GOULD.

By C. FRENCH, JUN.

THESE beautiful birds have just finished breeding in a swamp near Laverton, the first eggs being laid early in October. This is probably the first authentic record for Victoria. The nests, which were about 10 to 15 feet apart, were in the middle of a fairly large swamp, and were placed on clumps of the dwarf salt-marsh plant, *Salicornia australis*, Sea Crab-grass. They were composed principally of a dried alga, *Lyngbya æstuarii*, with other aquatic plants, and measured approximately 8 inches across, being built up about 9 inches above the water. Dead twigs of the Salicornia were placed on the top of the nests. Several nests were placed on burnt clumps of the Awned Sword-Sedge, *Gahnia trifida*, about 12 inches above the water. Most of the nests contained four eggs, but one nest was discovered which contained five eggs. Most of the eggs were placed with the small ends pointing towards the middle of the nest, but in some instances several of the eggs had the small ends pointing outward. Unfortunately, before all the eggs were hatched out the swamp commenced to dry up, and the old birds left the locality, causing a number of eggs and young birds to be deserted.

A pair of adult birds, four young ones, and a nest containing a clutch of five eggs were presented to the National Museum, Melbourne. The Curator, Mr. J. A. Kershaw, is having a group prepared, which will be on view shortly at the Museum.

I am indebted to Professor Ewart for the name of the Sedge, *Gahnia trifida*, and to Mr. A. D. Hardy, F.L.S., for the name of the alga, regarding which he says:—"The nests are principally composed of an alga, *Lyngbya æstuarii* (Mert.), Liebman, belonging to the class Myxophyceæ (= Cyanophyceæ or blue-green algæ). It is one of those plants which, on account of their power of adaptation to either fresh-water or saline situations, preclude the drawing of any hard and fast line between the marine and fresh-water algæ."

28th December, 1911.

RAINBOW-BIRD OR BEE-EATER.—May I suggest to our ornithologists the reconsideration of the vernacular name of *Merops ornatus*? Though its affinities lie with the well-known family of "Bee-eaters," the common application of the name of Bee-eater is likely to do the bird a great deal of harm as time goes on. This bird may, and probably does, eat some bees, but I have observed it feeding on many occasions in various

parts of New South Wales, and have never seen it eat any, though I have seen it eating large quantities of other insects. Many people only need a very small excuse for the destruction of native birds, and the name of "Bee-eater" is a fine "handle" in itself. Now, I have found this bird to be widely known in New South Wales as "Rainbow-bird," and I notice that Mr. Leach gives that as an alternative title in his "Australian Bird Book." Why not, then, in the cause of the protection of this bird, adopt "Rainbow-bird" as the *principal* vernacular name for this beautiful and graceful thing? Naturalists will still know that it is a member of the Meropidæ, or Bee-eaters. —David G. Stead. Sydney, 27th December, 1911.

Melbourne Botanic Gardens.—A guide plan, on the scale of 5 chains to 1 inch, of the Melbourne Botanic Gardens and surroundings has just been issued by the Lands Department. It has been beautifully executed, and enters into minute details of the area bounded by the St. Kilda-road, Domain-road, and Anderson-street, with a large portion of Yarra Park, and shows what a grand asset Melbourne possesses in that block. Now that "The Grange," at the corner of St. Kilda and Domain roads, has been to some extent destroyed by fire, it is to be hoped another effort will be made to restore the site to the Domain. Another blot is the portion recently excised in Domain-road for the purpose of a wireless telegraphy station, which we trust is only temporary.

The Dune-Areas of New Zealand.—Dr. Cockayne, F.L.S., has written another of his painstaking reports on the economic botany of New Zealand, taking for his subject the treatment of the sand-dune areas of the Dominion. Naturally, with so many miles of sea-coast, large areas of sandy wastes are likely to occur, and Dr. Cockayne estimates these at 290,000 acres in the North Island and 24,000 in the South Island. Dealing first with the geology and botany of the dunes, he shows how they originate and spread and shift their positions. He next describes the various plants with which they are to some extent clothed. The most important part of the report, however, is that which deals with the means of reclamation of the dunes, which he regards as quite possible, both as grass lands and sites for the growth of certain timber trees, and in this latter connection no less than twenty-seven eucalypts and eight acacias are named. The report is copiously illustrated with many beautiful plates, and not the least interesting part is the splendid bibliography of the works consulted, both relating to New Zealand and to other parts of the world.

In the Heytesbury Forest.—The column "Bush Notes," by "F.R.," in the *Australasian*, is usually worth reading. In the issue of Saturday, 6th January, he gives a pleasant account of recent wanderings between Camperdown and the sea. The district is, he says, a wonderful place for bird-life. The Heytesbury Forest does not consist of a dense growth of tall trees, but of more open country, with plenty of medium-sized shrubs, &c., such as birds delight in. If there are birds about, November is the month to hear them. The glorious fluting of the thrush was to be heard through the forest all day long, while the sweet, silvery song of the pretty little White-shafted Fantail betrayed its presence everywhere. Robins were disturbed on their nests, and "F.R." thinks that both the Scarlet-breasted and the Flame-breasted were present. Kookaburras were very numerous, and one afternoon a dozen of them set up a chorus, the sound of which can scarcely be imagined. Parrots of many species, especially Rosellas and Crimson-winged Lories, were common. Gang-Gang and Black Cockatoos were in evidence. From end to end the forest was blue with wrens, and the singing of them and the tits often made quite a chorus. The glorious cobalt-blue of the wren was a dominant colour-note of the bush, and caught the eye instantly. Wood-Swallows were very plentiful everywhere. The Halcyon Kingfisher betrayed itself by its high-pitched, monotonous "Too-too-too-too." There are always the four notes, and the bird keeps up the call for an interminable time. Dozens of other species are mentioned, and the ramble must have been a delightful one.

A New Tourist Map.—The Lands Department issued just before the Christmas holidays a tourist map of the Healesville, Marysville, and Warburton districts, and, as Lilydale is also shown, it may be imagined that only a small amount of detail can be given, the scale being 1½ miles to 1 inch. The district can fairly be called a mountainous one, yet little beyond the Dividing Range is shown. One unacquainted with the district might take it with him and expect to find a nice level walk from, say, Healesville to Launching Place, whereas he would have a climb of at least 2,000 feet half way on his journey. Again, such beauty spots as Mathinna Falls, Condon's Gully, Myrtle Creek, and Britannia Falls are not marked. Ben Cairn appears to be placed too far to the north, while the heights of Juliet (the most commanding mount on the map) and other summits are not given. The only new information vouchsafed is the new tourist track to Donna Buang, and that is on so small a scale as to be practically useless. We hope detail maps of each district will be issued at no distant date.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 15th January, 1912. The president, Mr. F. Wisewould, occupied the chair, and about 40 members were present.

CORRESPONDENCE.

From the Railway Commissioners, acknowledging receipt of the committee's complaint with reference to the covering of certain rock exposures in cuttings with vegetation, and, in reply, stating that "renewed instructions are being issued to preserve, within a reasonable limit, the conditions prevailing at the various railway cuttings referred to."

From the hon. secretary of the projected Educational Congress (Dr. J. W. Barrett), announcing the dates fixed for meeting, and inviting one representative of the Club to attend. On the recommendation of the committee, the meeting unanimously appointed the president to attend in the interests of the Club and education.

From the Minister of Lands, in reply to a letter from the Club protesting against the giving-up of any portion of the public reserves, especially the Domain, for a wireless telegraphic station. The president said that, on receipt of this reply, he had again written, saying that, even if the structure being erected did not offend as an eyesore in the principal approach to the city, it was still a distinct encroachment on a public reserve which should have been considered inviolate.

REPORTS.

A report of the whole-day excursion to Mount Donna-Buang, Warburton, on Saturday, 16th December, was given by the leader, Mr. A. D. Hardy, F.L.S., who said that a party of eight members and friends went to Warburton by the evening train on Friday, but the Saturday turned out to be most unsuited for the excursion, frequent heavy showers rendering the track slippery and the vegetation too wet to ramble amongst. Advantage was taken of portion of the new track in course of construction by the Public Works Department, which follows an easy grade towards the head of the Yithan Creek. The summit, 4,080 feet above sea level, was reached about mid-day, but driving showers obscured the view in every direction. The feature of the outing was the wonderful floral display made by the small ivy-leaved violet, *Viola hederacea*, which, on the summit of the range, was blooming in countless numbers, the

masses of flowers appearing at a little distance like patches of snow. The flowers were remarkable also for the length of their stalks, many being from six to nine inches long. Insects were, under the circumstances, very scarce, but he considered the mountain would repay another visit under more favourable weather conditions.

A report of the excursion to Kororoit Creek, for pond-life, on Saturday, 13th January, was given by the leader, Mr. J. Shephard, who reported that, doubtless deterred by the somewhat long and uninteresting walk from North Williamstown railway station, especially on a summer afternoon, the excursion had been poorly attended. The creek was in good condition as regards water, but the plankton of the open water consisted almost entirely of a rotifer belonging to the widely distributed and variable genus Anurea. Along the bank, among conervæ and weeds, Entomostraca occurred sparsely, and those taken have been handed over to Mr. Searle for examination. The very brief opportunities since for making further examination of the gatherings had not resulted in the identification of any other form of importance. While returning to the station a large flock of White-fronted Herons was seen feeding in a swamp near the rifle ranges, soon to be molested by the inevitable ".pot-hunter," who was in the vicinity on the look-out for sport.

ELECTION OF MEMBER.

On a ballot being taken, Master William Searle, Lygon-street, North Carlton, was duly elected a junior member of the Club.

GENERAL BUSINESS.

The hon. secretary said that members would be pleased to know that the Public Works Department had arranged for the opening of a track from the upper portion of Myers Creek to the top of Mount St. Leonard, the route followed by some members of the Club during a recent visit to the district. He hoped that it might also be possible to do a small amount of clearing on the summit, whereby the magnificent panoramic view would be greatly improved.

PAPERS READ.

1. By Mr. F. J. Thomas, entitled "Bird-Life on the Upper Mitchell River."

The author, in a few brief notes, called attention to the possibilities of the creek gorges of the Upper Mitchell as observation grounds for naturalists, and recorded forty-seven species of birds as having been seen by him one day in November last. Included in the list were the Bell Miner, Sanguineous Honey-eater, and Wonga Pigeon.

2. By Mr. Joseph Gabriel, entitled "Further Notes on the Mutton-Birds of Bass Strait."

The author discussed the question of whether the depredations of eggers, and the slaughter of young birds, had had any effect in diminishing the numbers of Short-tailed Petrels, *Puffinus brevicaudus*, popularly known as "Mutton-birds," frequenting the "rookeries" of Phillip Island and the islands in Bass Strait. He gave the results of his experience of the rookeries for nearly thirty years, and considered that the birds are as numerous as ever, but thought that, in view of the future, no eggs should be allowed to be taken after 30th November in each year; that all eggers and bird-gatherers should be registered; that no nets should be allowed for taking young birds; and that no dogs should be allowed near the rookeries. With regard to reported cruelties on the part of eggers and others, he was of opinion that most of the birds picked up torn and dead had met their death by collision with the barbed-wire fences which of late years have been erected in the vicinity of the breeding-grounds.

The paper gave rise to some discussion, during which Mr. G. A. Keartland said that it was not generally known that if birds are robbed of their eggs or young ones they usually have a fresh nest built and a clutch of eggs laid within fourteen days. He instanced a case in which a pair of Grallinas were robbed three times, and then built a fourth nest, laid the full complement of eggs, and reared their brood A pair of Black Fantails did the same, owing to their nests being destroyed. Mr. J. A. Kershaw, F.E.S., said that there was a Mutton-bird rookery on Doughboy Island, in Corner Basin, within the boundary of the National Park, but during a recent visit to the island he had seen several dead birds, which had evidently been shot. Mr. J. A. Leach, M.Sc., said that the take of young Mutton-birds on Cape Barren Island had been greatly reduced, owing to the Tasmanian Government having leased the island for grazing purposes; the cattle trampled down the rookeries, and prevented the birds from nesting. With regard to the birds striking the wire fences, he knew of a case in the mallee where a barbed wire, stretched about ten feet above the surface of a dam, was the means of stopping and wounding numbers of wild ducks.

3. By Messrs. Gregory M. Mathews, F.R.S.E., and Tom Iredale, entitled "'Perry's Arcana'—an Overlooked Work" (communicated by Mr. F. G. A. Barnard)

The authors said that recently they had occasion to go through "Perry's Arcana," a natural history serial, published in 1810–11, and, as it has been almost entirely overlooked by systematists, is very little known; but, from the fact that it

contains coloured plates and descriptions of several Australian forms, they thought that the publication of its contents in some easily accessible journal, such as the *Victorian Naturalist*, would be an advantage, they had therefore compiled a brief summary of the contents of the plates, with explanatory notes where required, remarking that, if this work is to be considered in connection with the priority of naming, then several changes of nomenclature will be necessary.

Some discussion ensued, in which Messrs. J. A. Leach, M.Sc., E. A. Petherick, F.L.S., and J. A. Kershaw, F.E.S., took part.

NATURAL HISTORY NOTES.

Mr. J. Searle said that, while searching for Copepoda in December last in a dam at Jumbunna, his attention was attracted to the curious appearance of the numerous water-boatmen and other aquatic insects swimming about in the water. Close examination showed that nearly every individual had one or more minute bivalve mollusca, probably of the genus Pisidium, attached to its legs. It seems probable that while walking or foraging on the bottom of the dam the insects thrust their feet into the open valves of the mollusc, which immediately closed, and remained attached when the insect swam away. Such a fact he had not seen recorded, and he exhibited some of the insects, with the molluscs attached, preserved in formalin.

Mr. J. Searle also recorded that for three years in succession he had been successful in hatching out *Daphnia carinata* and another smaller species from ephippial eggs collected over four years ago. The gathering, which contains great numbers of these resting eggs, is almost pure sand, and has been stored in a bottle with a metal screw top. Each year a little of the material has been placed in a perfectly clean glass observation tank, which is then filled up with ordinary Yan Yean tap-water. In a week or ten days a number of these small crustaceans hatch out. He said that he had still some of the material left, and he intended to repeat the experiment every year, in order to see how long the eggs will retain their vitality. He exhibited specimens of the crustaceans which he had reared.

Mr. J. Shephard said Mr. Searle's note was very interesting, in view of the experiments made in Europe of rearing similar animal life from dried mud from different parts of the world, and he hoped Mr. Searle would give a more extended account of his results.

Mr. J. G. O'Donoghue reported having observed a pair of Australian Bustards, *Eupodotis australis*, popularly known as wild turkeys, in a stubble-field near the Rowsley State school, about six miles south of Bacchus Marsh, on Sunday, 31st

December. These birds might be the last survivors of a small flock that ranged the plains in the neighbourhood of the Balliang Creek for a number of years. On the same date he saw several White Ibis, *Ibis molucca*, in the neighbourhood of Anakie. A week previously seven of these birds were noticed in company with some Straw-necked Ibis, *Carphibis spinicollis*, beside a swamp near Rockbank. On the same day, when journeying through the Brisbane Range between Rowsley and Beremboke large numbers of Bronze-wing Pigeons, *Phaps chalcoptera*, were flushed from the roadside. The birds were attracted by *Acacia Mitchelli*, which, while flowering profusely, was shedding an abundance of the previous season's seed.

Mr. G. A. Keartland reported having recently seen a Spotless Crake, *Porzana tabuensis*, at North Preston. It was found by a dog, near a watercourse, and followed for some distance before it flew, thus enabling a good view to be obtained of it. This is the first time it has been reported so near Melbourne.

EXHIBITS.

By Mr. J. Cronin.—Flowering branches of the Cedar or Pepper-tree Wattle, *Acacia elata*, A. Cunn., also of the Swamp Mahogany or Turpentine-Box, *Tristania laurina*, R. Br., from trees now flowering luxuriantly in the Melbourne Botanic Gardens.

By Mr. J. E. Dixon. — About 80 species of Coleoptera, recently collected at Warburton and Portland.

By Mr. J. Gabriel. — Eggs of the Short-tailed Petrel or Mutton-bird, *Puffinus brevicaudus*.

By Mr. A. D. Hardy, F.L.S. — Specimens of *Lyngbya æstuarii* (Mert.), Liebman, the alga of which the nests of the White-headed Stilts recorded by Mr. C. French, jun., in the January *Naturalist* were composed.

By Mr. W. G. Mackintosh. — Fossils from Maria Island, Tasmania.

By Mr. F. Pitcher. — Dried specimens of the Ivy-leaved Violet, *Viola hederacea*, Lab., with exceptionally long stalks, from Mount Donna-Buang, Warburton; also stem of Batswing Fern, *Pteris incisa*, over seven feet in length, from Warburton.

By Mr. P. R. H. St. John.—Dried specimens of *Eucalyptus Consideniana*, Maiden, "Yertchuk," collected at Eltham, August, 1911, not previously recorded as found growing near Melbourne (other Victorian localities—Toongabbie, Walhalla, Metung, &c.; found also in New South Wales); also young plants of *Eucalyptus regnans*, F. v. M., and *E. rubida*, Deane and Maiden.

By Mr. J. Searle.—Water insects with minute molluscs

attached, in formalin; also Daphnia hatched from ephippial eggs collected more than four years ago.

By Mr. F. Wisewould.—Land shell, *Rhytida cappillacea*, from Pakenham.

After the usual conversazione the meeting terminated.

EXCURSION TO HEALESVILLE.

The morning of Saturday, 25th November, the day appointed for the whole-day excursion to Healesville, opened delightfully fine, and when the train arrived from Melbourne at a quarter past ten I was pleased to find a party of eight members, representing almost all the branches of the Club's activities, had undertaken the forty-mile journey for the sake of a day among the hills. My co-leader, Dr. Shaw, F.E.S., had agreed with me a few days before that the valley of the Myers Creek would probably prove the most satisfactory hunting-ground at that time of year. Some of us had traversed this track on the evening of the return trip from Toolangi, in November, 1910. The Myers is a tributary of the Chum Creek, which it joins about a mile above the confluence of that stream with the Watts. It rises in the gullies of Mt. St. Leonard, in a forest area, and has a southerly course a little to the west of the Metropolitan Board's territory. The valley of the Myers is lavishly filled with gully shrubs and ferns, from magnificent specimens of the tree-ferns—*Alsophila Australis*, *Dicksonia Billardieri*, and *Osmunda barbara*—to fine patches of the small Rat-tail Fern, *Asplenium flabellifolium*, with a great variety of mosses. Of late years a good road has been made right through the scenery, running above the old tram track. Taking a cab to the junction of the Chum and Myers, here lined with *Leptospermum lanigerum*, *Prostanthera lasiantha*, *Pomaderris apetala*, *P. vaccinifolia*, *Acacia melanoxylon*, and *A. dealbata*, so as to avoid tramping the first few less interesting miles, a start was made along the banks of the creek, and from there onward there was no lack of beauty. Before entering the gully is a patch scattered with *Leptospermum scoparium* and stray plants of the clay country, such as are found around Ringwood, and here, too, is the farthest point of penetration into the mountain country of *Eucalyptus Stuartiana*. At the entrance is a particularly thick patch of *Daviesia ulicina*, now covered with angular green fruits. At the time of the wild-flower show this was a mass of bloom. As you proceed along the road the hill into which it is cut rises steeply on the left (western) side, while the stream is kept on the right. Beyond that the hills rise. So by following this road one passes through two belts of entirely different classes of vegetation. On the upper side *Helichrysum semi-papposum* was plentifully distributed along the bank in short

growths : on the lower it grew tall and luxuriant, making an exception to the rule. Above, too, were fine late blooms of *Grevillea alpina* and seed-laden bushes of *Pultenæa Muelleri* ; but *P. Gunnii*, which had flowered first, in many cases still retained its bloom in remarkable freshness. All along the creek-banks the Musk-tree, *Aster argophyllus*, and the Blanket-bush, *Senecio Bedfordi*, were in full flower, the heads being unusually large and conspicuous in a fine setting of the fronds of tree-ferns and the dark green, glossy leaves of the Native Mulberry, *Hedycarya cunninghami*. Arriving at the falls, five miles from Healesville, we lunched, and, while the billy boiled, partook of refreshing draughts of real mountain dew, innocent of corn or still. Here observations were discussed and specimens identified. Some of the party had followed the road and some the old tram track, that passes the whole way through one long, cool bower. In this fashion we continued for a mile or so till at a bridge the two tracks crossed. Here another spell was taken and observations discussed. Some of the party followed the shady tram track and others the road, which was now on the right of the stream, the hill rising on the right side of the road possessing many new species. Shortly we reached a fine growth of *Prostanthera melissifolia*, bushes of which were scattered at intervals along the rest of the route. This shrub, which was in its full glory of delicate lavender flowers on Cup Day, when the leaders rode and spied out the land, was just beginning to lose its bloom. From some the petals had all fallen, some were in half-dress, but occasionally others were sufficiently late to excite the admiration, mute or exclaimed, of everyone. Here, too, *Pultenæa scabra* had in a fortnight gone out of flower ; but the lemon-coloured flowers of *Eriostemon correifolius* were yet to be seen. *Aster stellulatus* was magnificent, and the scent of festooned Clematis suffused the valley. The somewhat inconspicuous *Astrotricha ledifolia* was in full flower and plentiful, and pretty violets clothed the cutting. Along the right-hand bank, with western aspect, some very fine patches of *Asplenium flabellifolium*, several yards wide, were growing amongst the talus or loose stone formation. Their fresh greenness contrasted with those in small patches which we had seen growing in crevices and little ledges on the vertical face of rock near the falls. *Apropos* of rock formation, hereabouts were several, and one in particular, before reaching the bridge crossing referred to, that showed various stages of floral colonization, from the first Lithophytes in the nature of crustaceous lichens through the moss stage (Polytrichum and Dicranum) up to Chasmophytes, which ranged from *Gnaphalium luteo-album* to *Aster argophyllus*, and even Acacias This rock was interesting in that it illustrated the struggles of contrary

natural forces—the one endeavouring to clothe and the other to bare the surface. The outer edge next the creek bore evidence of desiccation where mats of moss had dried and blown off and where the lichen was renewing its work ; but in towards the hill, where the rock dipped downwards, it was covered with an increasing depth of detritus, and eventually decomposed rock, which was permanently shrub and then tree-bearing. On the track near by were found a couple of plants of the orchid *Chiloglottis Gunnii* in bloom, their tubers well beneath the wooden tram rail, their stems lateral, till the leaves were able to assume a normal position on the line. This orchid was also seen in a seeding state on the trunks of the tree-ferns. The small form of *Viola hederacea* figured also as an epiphyte. This little plant has two distinct forms—here one grows in mats, thickly covered with pale blue and white flowers on short peduncles ; the other, more scattered and sometimes in the middle of a mat, with large leaves and bluer flowers on long peduncles. The intergrowth disposes of the theory that the difference is due to better soil, water supply, or light. One feels often inclined to lapse in these cases to the fatalist doctrine, and say they are different because they are.

Resuming our journey with a hot afternoon sun shining on the high road, I was asked had I any justifiable reason for taking my followers in the heat when the bird and fern men and Mr. Kershaw (keen on Planarians) could keep to the cool avenue of the tram track. My affirmation was accepted. It *was* worth while. The gully lay below us—a stream of tree-ferns and glossy shrubs. On either slope rose the tall white stems of Mountain Blue Gums, *Eucalyptus goniocalyx*, whose waxen leaves, from cordate to oval, or from oval to foot-long lanceolate, contrasted with the shorter foliage of the white-stemmed Mountain Ash, *E. regnans*. Here and there were dotted *E. amygdalina*, some with broad leaves and others with the pretty drooping foliage of the variety *microphylla*. Flowering shrubs, and the wild lianes, Clematis, Tecoma, and Lyonsia, varied the scene, but every now and again the Alsophilas, usually scattered on the hillside, formed a group or bower lovely to behold. The whole roadside was redolent with perfume and bright with flowers, and from its side gushed little streams of icy-cold, pure water, that proved extremely welcome. A couple of miles or so above the falls is Kay's, a comfortable boarding-house, and there five of our party had arranged to stay the night, in order to climb Mount St. Leonard, now showing above the forest, in the morning. At the branching of the roads two streams join, and on the bridge we parted at four o'clock. The return trip in the cool of the evening was delightful, and the view of the gully more exquisite than on

the outward journey. Messrs. Barnard, Sutton, Hardy, Kershaw, and Mowling, who remained behind, admit that the best of the flora had been seen. Messrs. Pitcher and M'Gowan returned to town by the evening train, but Mr. Nicholls, whose list of birds is appended, stayed the night and Sunday with me. The birds marked * were seen on the trip; those unmarked were seen or heard from the grounds of my residence, Mount Yule. Of those marked †, only the note was heard at Mount Yule.

*	Nycticorax caledonicus	Nankeen Night-Heron
*	Notophoyx novæ-hollandiæ	White-fronted Heron (numerous on Yarra flats—seen from train window)
	Cerchneis cenchroides	Nankeen Kestrel
*†	Cacatua galerita	White Cockatoo
*†	Platycercus eximius	Rosella
*	Dacelo gigas	Laughing Kingfisher
*	Halcyon sanctus	Sacred Kingfisher (young in nest)
*†	Cuculus inornatus	Pallid Cuckoo
*†	Cacomantis rufulus	Fan-tailed Cuckoo
*	Chalcococcyx plagosus	Bronze Cuckoo (being pursued by female White-throated Thickhead)
	Chelidon neoxena	Welcome Swallow
*	Rhipidura albiscapa	White-shafted Fantail
	Coracina robusta	Black-faced Cuckoo-Shrike
*†	Psophodes crepitans	Coachwhip
	Merula merula	Blackbird (introduced)
†	Cisticola exilis	Grass Warbler
	Acanthiza pusilla	Brown Tit-Warbler
	Sericornis frontalis	White-browed Scrub-Wren
*	Malurus cyanochlamys	Superb Warbler (full plumage)
*	Grallina picata	Magpie-Lark
†	Colluricincla harmonica	Grey Shrike-Thrush
	Gymnorhina leuconota	White-backed Magpie (feeding young)
*	Cracticus destructor	Butcher-bird
*	Pachycephala pectoralis	Golden-breasted Whistler
*†	Eopsaltria australis	Yellow-breasted Shrike-Robin
	Zosterops cœrulescens	White-eye
	Pardalotus affinis	Diamond-bird
†	Meliornis pyrrhoptera	Crescent Honey-eater
	Ptilotis penicillata	White-plumed Honey-eater
	Anthochæra carunculata	Wattle-bird (feeding on flowers of torch-lily, Tritoma varia)
	Tropidorhynchus corniculatis	Friar-bird
*	Anthus australis	Pipit (seen from train)
†	Mimetes sagittata	Oriole

I am indebted to Messrs Barnard and Kershaw for a few notes on the next day's proceedings, which are as follow :—

Mr. Barnard says :—" Four of the party had arranged before leaving town to spend the week-end at a boarding-house at the upper end of the valley, and, hearing this on Saturday, another member would not be denied the chance of doing likewise. The party found the crossing-place on Myers Creek an excellent place for young plants of Gleichenia, Osmunda, &c., while young seedlings of the Prostanthera were found in plenty on the hillside above the creek. On Sunday morning, soon after

eight, they started, accompanied by Mr. Arthur Kay as guide, for the climb of Mount St. Leonard, a distance of about three miles, and an ascent of about 1,800 feet. No definite track exists, but by making use of an overgrown timber slide, and pushing their way through a dense growth of *Aster stellulatus* and *Cassinia aculeatum*, they reached an old paling-getters' road, marked on the maps, but long disused. From there cattle-tracks through the bracken and Senecio were followed to a very welcome spring. As they ascended fine views opened up of the lower country, but, owing to haze, Ringwood was the limit in a westerly direction. After the bracken belt a stony (dacite) area was entered, covered with large fallen trees. They were now on the crest of the ridge, about a mile south of the summit. Here were seen some very fine Prostantheras, which were in better condition than those in the lower country, and the entomologists were gladdened by the sight of numerous specimens of that beautiful butterfly, *Papilio macleayanus*, flying tantalizingly just out of reach of the net; however, when the top was reached, and more time could be given to the quest, at least a dozen specimens were captured, while many others were missed. There was nothing remarkable about the vegetation on the top, the only plant of note being a specimen of the Native Pepper, *Drimys aromatica*, which, with its fresh green leaves and deep crimson-red stems, made a pleasing contrast to the grey stones of the low cairn close by which it was growing. The panoramic view from the top was very fine, and, though the landscape west of Ringwood was still shrouded in haze, all the intermediate country, with its townships, roads, streams, hills, &c., was spread out like a map. The height of St. Leonard is given as 3,304 feet, and its peaked form makes it a splendid look-out. The view extended from Mount Blackwood round to Mount Buller, near Mansfield, 120 miles apart, with a fine view of the Watts valley winding round the flanks of Juliet. An hour was spent securing photographs, and then descending, more rapidly than the ascent had been made in the morning, the cool waters of Myers Creek were reached by 2.30, and the climbers took the opportunity of a paddle and a splash to cool their heated bodies. Leaving soon after four, Healesville was reached in ample time for the evening train, though time was spent securing seedlings on the way down."

Mr. Kershaw who devoted his attention principally to entomology, says:—"The most interesting capture was a specimen of the blue butterfly *Candalides absimilis*, Feld., which was taken on the extreme summit of Mount St. Leonard. Although common in New South Wales and Queensland, it is very rarely met with in Victoria. My previous captures were

made at Narracan, Gippsland. Other butterflies observed on the summit of the mountain were :—*Papilio macleayanus*, *Epinephila abeona*, *Pyrameis itea*, *P. kershawi*, *Zizera labradus*, and the skipper *Trapezites phigalia*. The Wood White *Delias aganippe* was seen at Myers Creek. Among the moths taken during the trip were *Phalænoides tristifica*, Hübn., *Porthesia obsoleta*, *Taxeotis delogramma*, *Aciptilia aptalis*, Walk., and *Tortricopsis uncinella*, Zell. The principal Coleoptera taken were, among the Carabidæ—*Phersita melbournensis*, Castel., *Promecoderus elegans*, Casteln., *Loxodactylus carinulatus*, Ch. ; Lucanidæ—*Ceratognathus niger*, Westw., *Lissapterus howittanus*, Westw. : Scarabæidæ—*Bolboceras kirbyi*, Westw., *Polystigma punctata*, Don. ; Tenebrionidæ—*Apasis howitti*, Pasc. : Curculionidæ—*Aterpus cultratus*, Enil., *Belus bimaculatus*, Pasc., *Haplonyx maialis*, Pasc. ; Chrysomelidæ—*Chalcolampra pustulata*, Baly. Two dragon-flies—*Austroæschna parvastigma*, Sely., and *Lestes analis*, Ramb.—were also taken."

My co-leader, Dr. Shaw, reports that the season was not far enough advanced for his branch of entomology, the Orthoptera, for only immature forms were noted.—Reginald Kelly.

Victorian State Forests.—The recently issued report of the Department of State Forests, Victoria, for the year ending 30th June last, contains some interesting information. The Conservator of Forests says the output of sawn hardwood for the year was about 53,000,000 feet, of which the Warburton, Toolangi, and Yea division contributed nearly 30,000,000, while the Otway and Heytesbury mills cut 9,300,000 feet. The production of red gum by the mills along the Murray amounted to 3,930,000 feet. A gratifying record is given of various works carried out for the improvement of the forests, and of the work done in the nurseries and plantations, some 2,750,000 seedlings having been put out. In a report on the giant trees of Victoria, Mr. A. D. Hardy, F.L.S., summarizes such information as has been published from time to time regarding the tall trees of the State, from which it appears that Baron von Mueller's statement that he had measured trees of 420 feet and 480 feet on the Blacks' Spur is questioned. A definite record exists of a prostrate tree in the Otway Forest measuring 329 feet to where the top was broken off, at which point the stem diameter was still 10 inches, the general conclusion being that there are many trees still existing of 300 feet and slightly over. As regards girth, 64 feet at 8 feet from the ground, also an Otway Forest specimen, seems to be the record. These figures closely approximate those of the Redwoods of California, definite measurements of which also seem difficult to obtain.

SOME NEW VICTORIAN COPEPODA.

By J. SEARLE.

(*Read before the Field Naturalists' Club of Victoria, 11th Dec.*, 1911.)

Two of the species described in this paper were collected at Nyora on 7th November, 1911; the other I have known for some time and collected in many places.

The Brunella was taken in a peaty swamp about a mile to the west of Nyora and south of the railway line.

It is a graceful animal, and can be distinguished readily from other species by the great length of its first antennæ. From this feature it takes its specific name, *B. longicornis*.

The second, *Boeckella nyoraensis*, is one of the largest, and by far the most striking, of all the Boeckellidæ.

The enormous thoracic projections of the female, and the amethyst tint of the antennæ, render it a striking object. This species was taken in a clear-water, weedy pond near the railway line, and about four miles west of Nyora.

The third species, *B. pseudochelæ*, is also a remarkable one, from the shape of the last pair of legs in the male. The end of the claw on the right leg possesses an appendage somewhat resembling the chela or nippers of a crab. It is not at all uncommon: I have taken it in great numbers at Yarra Glen and West Warburton, also at Fairfield and Mansfield, but always in small, shallow pools. Indeed at Mansfield I picked them up with a pipette from a small pool by the roadside in which the water was not three inches in depth.

The Boeckellidæ seem to be composed of two groups—one of a sturdy, thick-set nature, opaque and brightly coloured, the females possessing large wing-shaped projections on the last thoracic segment; the other more slender and graceful, translucent grey or green in colour, and with less prominent elongations on the thorax.

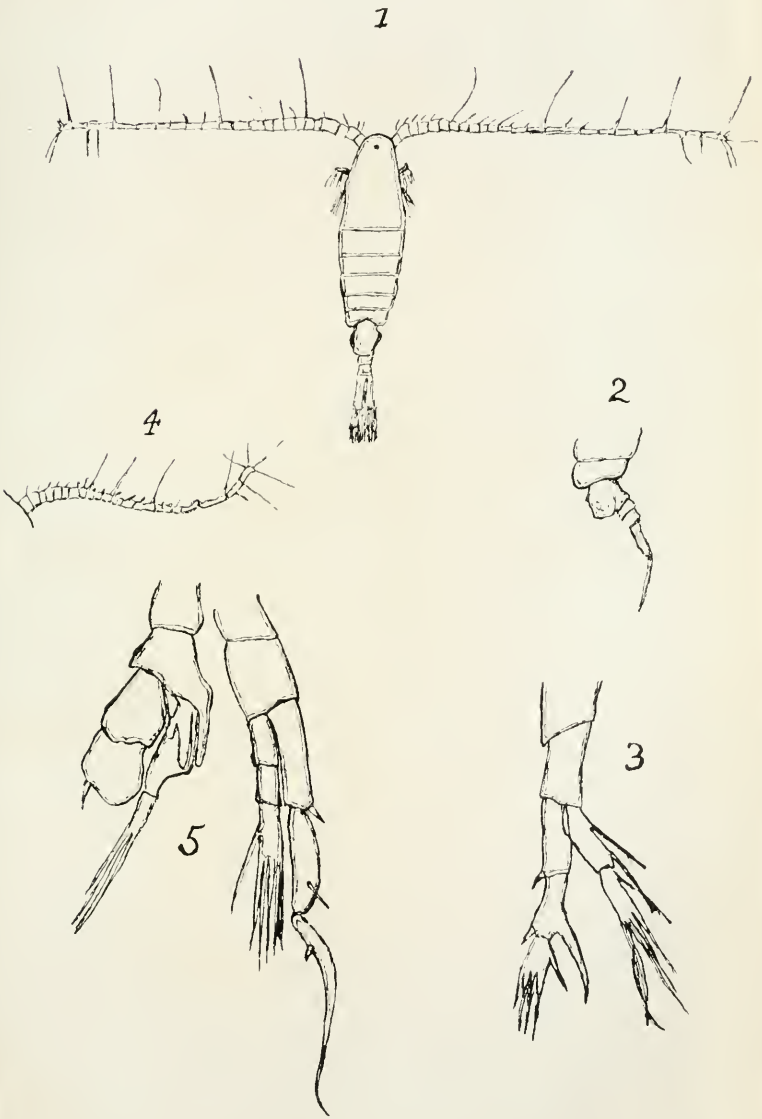
The two species of Boeckella here described belong to the former group. The figures are all drawn from specimens by the aid of a camera lucida.

BRUNELLA LONGICORNIS, J. Searle, n. sp.

This is the fifth species of Brunella I have recorded for Victoria, and second new species from Nyora.

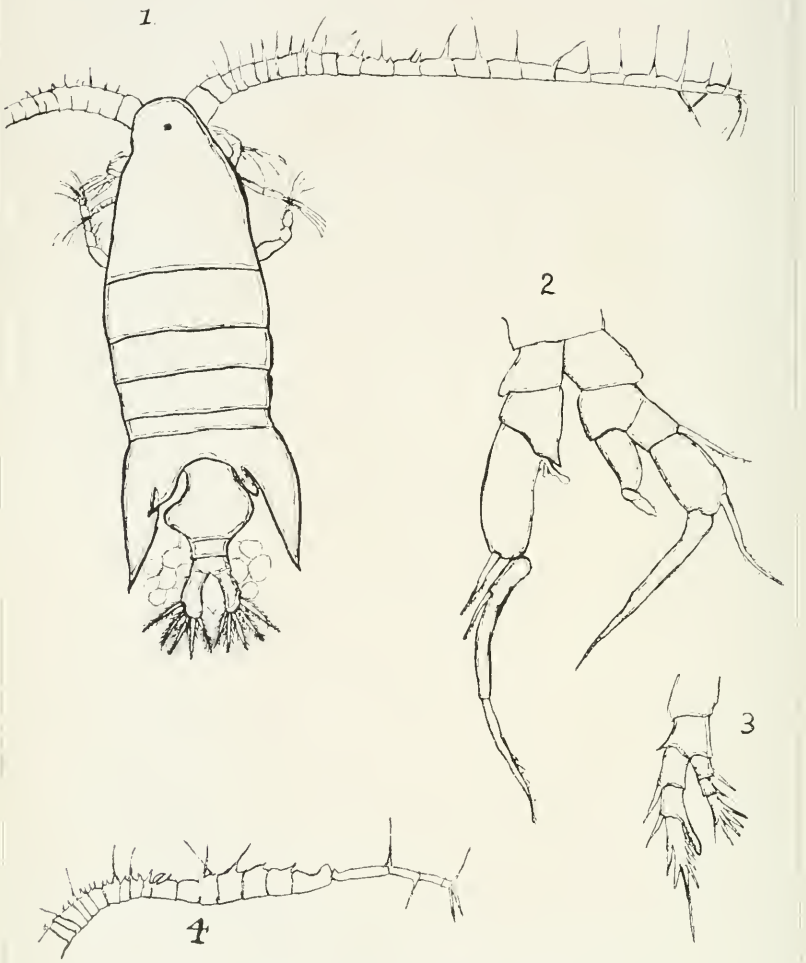
Specific Characters.—Body of female ovate in form, broadest at the first thoracic segment. Head and segment fused with it longer than the following three segments. Fifth thoracic segment small, without lateral projections, simply rounded off. Abdomen consists of three segments, genital segment asymmetrical, swollen in the middle, and very protuberant on the ventral side; caudal furca nearly as long as the abdomen. First

PLATE III.



BRUNELLA LONGICORNIS, J. SEARLE, N. SP.

PLATE IV.



BOECKELLA NYORAENSIS, J. SEARLE, N. SP.

antennæ of great length—far exceeding that of the whole animal, including the caudal setæ—and adorned with very long setæ.

Fifth thoracic legs in female of the shape typical of the genus.

Fifth pair of legs in male closely resembling those of *B. tasmanica*, having the spatulate exopodite and the peculiar lobes attached to the endopodite.

First antenna of male geniculated on right side, scarcely thickened in the middle, and furnished with numerous *æsthetasks*.*

Colour.—Brown.

Length.—1.5 mm.

Occurrence.—Nyora.

I have since collected this species in a swamp at Caulfield (2nd December, 1911).

BOECKELLA NYORAENSIS, J. Searle, n. sp.

Specific Characters.—Body of female oblong, with head tapering and rounded off anteriorly. Head and segment fused with it as long as the succeeding segments.

Fifth thoracic segment with enormous lateral projections, very slightly divergent, lanceolate, hooked outwards at the tip and extending backwards nearly to the end of the caudal furca; inner lobe on left side small, triangular, with pointed end, that on the right inconspicuous, with parallel sides, round at the end. The abdomen consists of three segments, genital segment asymmetrical, much swollen in the middle and slightly protuberant on the ventral side; furcal processes with short, very stout setæ, densely plumose; egg-sac containing thirty-five to forty eggs. First antennæ twenty-five joints, when reflexed reaching beyond the caudal furca. Fifth legs resemble *B. triarticulata*. First antennæ of male geniculated on right side, and bearing a great many *æsthetasks*.

The fifth pair of legs of male resemble those of *B. saycei*, but the spines on the first and second joint of the exopodite of right leg are setaceous, the terminal claw much straighter; the endopodite, with three imperfect joints, also differs somewhat in shape from *B. saycei*. The terminal claw on the left leg also bears numerous small setæ.

Colour.—Body green, antennæ ameythst coloured.

Length.—2.60 mm.

Occurrence.—Nyora.

* *Æsthetask* is the term applied by Geisbrecht to various-shaped attachments to the antennæ of Copepods; they are supposed to be of a sensory character ("Das Tierreich—Gymnoplea," Geisbrecht und Schmeil).

BOECKELLA PSEUDOCHELÆ, J. Searle, n. sp.

Specific Characters.—Body of female robust, oblong, rounded off in front, head and segment fused with it longer than the two following segments.

Lateral projections on fifth thorocic segment scarcely divergent—triangular; the inner ones, when viewed from the dorsal side, appear nearly equal in length to the outer ones, but distinctly hooked outwards at the tip. Seen from the side they are broad triangular plates, extending downwards considerably, and apparently shielding the genital segment.

First antennæ twenty-five joints, when reflexed reaching to the end of the first abdominal segment. Genital segment broad, slightly asymmetrical, protuberant on ventral side. Abdomen consists of three segments, and is about one-third the length of the body.

Fifth pair of legs in female resemble *B. triarticulata*, but are more slender. Fifth pair of legs in male are very remarkable, and are powerfully developed. Right leg—exopodite two-jointed, ending in a stout claw, which has a chela-like appendage at the tip, hence its specific name. Endopodite one-jointed, shaped at the base somewhat like *B. oblonga*, but is bluntly notched at the distal end, and is much swollen in the middle; it extends beyond the two joints of the exopodite. Left leg—exopodite two-jointed, the last joint being very slender and fused to the terminal claw; second basal joint ends in a rounded lobe inside, which is a triangular plate. Attached to this joint, and extending nearly to the end of the first joint of the exopodite is a thin, flat, hyaline plate, not easily seen unless the limb is moved about. Right antennæ of male geniculated; the peculiar projection on the second last joint forms a marked feature, closely resembling that of *B. rubra*.

Colour.—Reddish-brown.

Length.—2.50 mm.

Occurrence.—Yarra Glen, West Warburton, Mansfield, Fairfield.

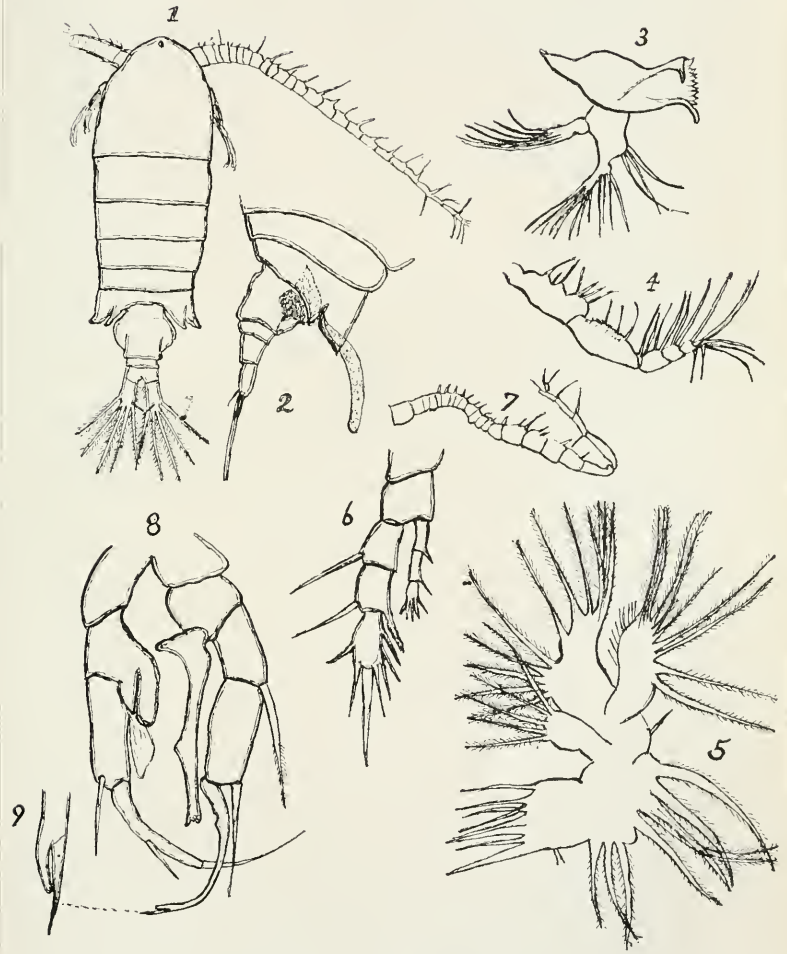
EXPLANATION OF PLATES.

PLATE III., *Brunella longicornis*, J. Searle, n. sp.—Fig. 1, adult female, × 29. Fig. 2, last thoracic segment and abdomen, female, side view. Fig. 3, fifth thoracic leg of female. Fig. 4, first antenna of male. Fig. 5, fifth pair of legs of male.

PLATE IV., *Boeckella nyoraensis*, J. Searle, n. sp.—Fig. 1, adult female, × 29. Fig. 2, fifth pair of legs, male. Fig. 3, fifth pair of legs, female. Fig. 4, first antenna of male, showing *æsthetasks*.

PLATE V., *Boeckella pseudochelæ*, J. Searle, n. sp.—Fig. 1, adult female, × 23. Fig. 2, side view of last thoracic segment and abdomen, with spermatophore attached near genital aperture. Fig. 3, mandible and palp, male. Fig. 4, second maxilliped, male. Fig. 5, maxilla, male. Fig. 6, last thoracic leg, female. Fig. 7, first antenna of male. Fig. 8, fifth pair of legs, male. Fig. 9, detail of end of claw.

PLATE V.



BOECKELLA PSEUDOCHELÆ, J. SEARLE, N. SP.

BIRD-LIFE ON THE UPPER MITCHELL.

By F. J. Thomas.

(*Read before the Field Naturalists' Club of Victoria, 15th Jan.*, 1912.)

The River Mitchell, which is formed by the union of several fair-sized streams rising in the southern slopes of the Australian Alps, passes through some rugged country as it approaches the lowlands in the neighbourhood of Lindenow and Bairnsdale.

I had often heard of the beauty of the gorges of several of the creeks entering the stream in the rugged portion of its course—notably two with the somewhat unpoetical names of Deadcock and Bull, so, when the opportunity occurred in November last of visiting them in company with Mr. S. Porteous, who was well acquainted with the locality, I gladly accepted it.

A ride of about twelve miles from Lindenow brought us to the junctions of the creeks with the Mitchell, which are not more than two hundred yards apart. We found them both to issue from wonderful gorges, somewhat similar in character to that of the Iguana Creek, some miles further south.

Both creeks are shut in by almost vertical sandstone cliffs about two hundred feet in height, while along the creek-beds are to be seen many small limestone caves. The gorges, being so well sheltered, are full of the most luxuriant vegetation, and looked at from above appear to be one dense mass of pittosporums, lillypillies, and supplejack. On entering them, however, one finds fairly easy walking over the stony creek-beds, and the beauties of the spot can be enjoyed with comparative comfort.

Our attention being mainly given to the birds, and our time being short, we had not much opportunity of searching closely for plants. Just at the mouth of the gorge there is a very numerous colony of Bell Miners. The birds were very noisy, and loudly assured us that they have many notes not nearly so beautiful as the one that has made them famous. Many of the old birds were busily engaged feeding young almost full grown. The limited range of each colony of these birds is very noticeable. The one I mention seems confined to a space of a few acres, and Mr. Porteous, who has known the district intimately for years, tells me that it is the only spot at which he has seen them. Just here we were fortunate enough to see a fine Wonga Pigeon. It flew from the ground into a large tree close by, and might have been difficult to locate only that two Bell-birds soon showed that they resented its intrusion. Good fortune followed us, and the best was to come. Turning up the Deadcock, we had gone a very little way when one of the rare and beautiful Sanguineous Honey-eaters flew down almost at our

feet, and for some time flitted about unconcernedly within a few yards of us, when it was joined by its mate. They were perfect little gems, and amply repaid us for our journey. A little later on we saw what we took to be another pair. The next bird of note was a Rufous Fantail which, like the family in general, had no fear of observers. Altogether we saw and heard forty-seven varieties that we knew, besides several others that we could not definitely identify.

The locality is one that should be very interesting alike to the geologist, the botanist, or the ornithologist; and as it is also fairly easy of access, I thought that these few notes might be of interest, and should any of the club members be in the district they would find it well worth a visit. The following were the birds identified during our visit:—

Black Duck
White-fronted Heron
Black-backed Magpie
Magpie-Lark
Rosella Parrot
Crimson Lory
Fairy Martin
Black Cormorant
White-fronted Chat
Stubble Quail
Australian Pipit
Brown Hawk
Allied Harrier
White-shafted Fantail
Black and White Fantail
Rufous Fantail
Brown Flyeater
Yellow-tailed Tit
Bell Miner
Sanguineous Honey-eater
Spinebill Honey-eater
Friar-bird
Wattle-bird
Yellow-faced Honey-eater
Scarlet-breasted Robin
Black-faced Cuckoo-Shrike
Brown Tree-creeper
White-throated Tree-creeper
Noisy Miner
Red-browed Finch (Waxbill)
Spotted-sided Finch
Olive-backed Oriole
White-winged Chough
Grey Bell-Magpie
Spotted Diamond-bird
White-eye
Yellow-breasted Shrike-Robin
Golden-breasted Whistler
Wonga Pigeon
Sordid Wood-Swallow
Superb Warbler
Bronze Cuckoo
Giant Kingfisher
Halcyon Kingfisher
Gang-Gang Cockatoo
Sulphur-breasted Cockatoo
Little Lorikeet

TOURIST MAP OF THE GRAMPIANS.—This recently issued map covers an area of about 9 miles by 14, detailing that portion of the Grampians between Hall's Gap and Mt. William. The scale being fairly large ($\frac{3}{4}$ of a mile to an inch), and the map full of detail, visitors should have no difficulty in finding the various points of interest. The cliff-face of the Serra Range is well shown, with its more prominent features distinctly marked and named. Half-a-dozen illustrations, with descriptive letter-press and lists of outings, make up a very handy guide to one of Victoria's grandest show places, more especially in the months of September and October, the wild-flower season.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th February, 1912. The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From the Secretary for Lands, stating that the Department encourages in every reasonable way the effective control of and the preservation of the tea-tree on the foreshore of Port Phillip Bay.

From the Microscopical Society of Victoria, inviting the members of the Club to attend the next meeting of the Society on the 26th February, which would take the form of a "send-off" to their hon. secretary, Dr. J. C. Kaufmann, who is about to visit Europe. On the motion of Messrs. Best and W. Stickland, it was resolved to thank the Microscopical Society for the invitation, and to join in the farewell.

REPORTS.

A report of the visit to the Botanic Gardens on Saturday, 10th February, was given by the leader, Mr. F. Pitcher, who said that there had been a fair attendance of members, who had spent a very pleasant afternoon. Attention had been given to the Australian trees and shrubs, and, among others, the Queensland Bean-tree had been seen in bloom, also *Eucalyptus tetragona*. A fair number of South African species were also in bloom, and proved of considerable interest. The Nymphæas and the Sacred Lotus also claimed attention, being in full bloom.

The hon. secretary reported that, owing to the extremely hot weather prevailing on Saturday, 3rd February, the meeting for juniors for the study of microscopic objects had been postponed.

Mr. F. G. A. Barnard reported that a meeting of the delegates to the National Parks Association had been held last week, when it had been decided to forward a memorial to Parliament protesting against proposed encroachments on park lands, and urging better care of the present reserves.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Frederick E. Gladman, Point Nepean-road, Elsternwick, and Mr. James Lambie, Glenferrie House, Glenferrie, were duly elected as ordinary members;

and Mr. Fredk. Parsons, State School, Lara, as a country member of the Club.

GENERAL BUSINESS.

Mr. G. A. Keartland said that the Ornithological Union and the Bird Observers' Club had issued a circular asking for information on the question of the most suitable date for the opening of the quail season, and asked members who had the opportunity to make a note of the state of the birds on the opening day, the 15th inst. Mr. J. A. Leach, M.Sc., said when taking part in a deputation to the Minister of Agriculture recently it had been admitted that opening the season on 15th February last year had been a mistake, and that the date would be revised if sufficient evidence could be brought forward to warrant a change. Mr. A. H. E. Mattingley, C.M.Z.S., said he believed the agitation for the early opening of the quail season was chiefly promoted by country shooters, who, to save themselves the trouble of travelling to any distance, desired to shoot the birds before they followed up the food supplies.

HON. ASSISTANT SECRETARY.

On the motion of Messrs. J. T. Hamilton, F.L.S., and A. D. Hardy, F.L.S., Mr. W. G. Macintosh was nominated for the vacant position of hon. assistant secretary and librarian.

PAPER READ.

1. By Mr. G. Weindorfer, entitled "Two Botanists in the Cradle Mountains, Tasmania."

The author described a trip taken by himself and his wife, with Mr. Ronald Smith, to the Cradle Mountain, Tasmania's highest peak, in January, 1910, when, though experiencing unfavourable weather, they were able to make an extensive collection of plants, many of which were of a very alpine character and extremely local in their occurrence. Many of the specimens collected were of great beauty, and he recommended the locality to anyone in search of new scenes and flowers.

Dr. C. S. Sutton, who read the paper in the absence of the author, gave further details regarding some of the plants and shrubs met with, and expressed his pleasure at having visited the mountains.

Mr. G. Coghill said he had been partly over the same ground a few weeks ago, and, though his visit had also been spoiled by wet weather, he had had a great treat from a botanical point of view.

NATURAL HISTORY NOTE.

Mr. F. Wisewould stated that during the recent hot weather a nest containing young swallows at South Gembrook proved too small for their comfort, for several times the birds got on

to the edge of the nest and then fell on to the ground, when they were replaced by the householder. After being thus replaced two or three times it was noticed that the old birds, when they saw the young ones on the edge of the nest, flew against them and knocked them back into the nest, thus saving them from falling on the ground.

EXHIBITS.

By Mr. F. G. A. Barnard.—Copies of tourist maps of Grampians and Healesville districts.

By Mr. J. Searle.—Under microscope, mounted specimens of Copepoda—viz., *Boeckella robusta*, *B. oblonga*, *B. minuta*, *B. symmetrica*, *B. rubra*, *B. insignis*, *B. nyoraensis*, *B. saycei*, and *B. pseudochelæ*; also *Brunella tasmanica*, *B. australis*, *B. viridis*, *B. ampulla*, and *B. longesetosa*, and other species.

By Master W. Searle.—Larvæ of Procession Moth, *Teara*, sp.

By Mr. P. R. H. St. John.—Dried specimens, in flower and fruit, of *Callitris propinqua*, R. Br., N.O. Coniferæ, collected at Werribee Gorge, 29th January, 1912, not previously recorded for Victoria: *Atriplex stipitatum*, Bentham, N.O. Chenopodiaceæ, same locality and date, not previously recorded for south of Victoria; also *Ranunculus aquatilis*, Linn.

By Dr. C. S. Sutton.—Dried specimens, photographs, &c., in illustration of paper by Mr. G. Weindorfer.

After the usual conversazione the meeting terminated.

EXCURSION TO WARBURTON.

The main object of this excursion being the ascent of the newly opened up Mount Donna Buang, and the railway time-table not allowing sufficient time for that to be accomplished in the interval between the arrival and departure of the daily trains, it was necessary to take the evening train to Warburton on Friday, 15th December. Our party consisted of seven members and friends, to several of whom the adjacent country was already familiar. The Friday was rather warm and close, with every appearance of a thunderstorm, but we reached Warburton (48 miles) about 8.45 p.m., before the threatened change. However, during the night we were awakened by thunder, presently followed by rain. Some were up early to reconnoitre and discuss the weather. A three-mile walk before breakfast up the Yarra valley served to show that since the last Club excursion to these parts civilization had made great inroads on the primitive bush, though, as a compensation, the numerous timber tramways enable one to penetrate to considerable distances into the forest with less trouble than formerly. After breakfast, just as we were setting out, a smart shower of fine rain came up from the south-west, and,

as there was every appearance of others to follow, we made a descent on the local store, and each secured a yard and a half of American cloth, which, with the aid of a safety-pin, formed a very serviceable "poncho," and, if it did not shield us entirely from the rain, it at least had the merit of keeping our shoulders dry, and was found to be considerably lighter and easier to carry than an overcoat. After making inquiries as to tracks, we decided to follow the tram line leading to Richards's mill, distant about a mile, but situated at least a thousand feet above the township, on the northern side of the Yarra. Several smart showers occurred before the mill was reached, and we were glad of an excuse to watch the huge logs being cut up into various-sized planks and boards. From the mill two or three tracks lead higher up, but we decided to keep to the tram-line, which presently became still steeper. The views down into the Yarra valley were very fine, but partly spoiled by the mist of passing showers. Presently we found ourselves among the clouds, cut off from all below. Onwards and upwards, in about another mile we reached the terminus of the tram-line, close to the new bridle-track in course of formation by the Public Works Department for the convenience of tourists, at a point about six and a half miles from its commencement, and three and a half from the summit of Mount Donna Buang. This track, it may be mentioned, starts from the bridge over the Yarra at the Adventists' printing works, near Four-Mile Creek, and, to gain the summit on an easy grade, has to make a considerable detour—first to the east, then north to Cement Creek, where the four-mile mark is situated; it then turns due south again, gaining almost the crest of the range, just where we struck it, at six and a half miles. The position of this track is marked on the new tourist map of the Healesville district. When this fine piece of work is completed the ascent of the mount will be an easy matter, though occupying perhaps a little more time. The vegetation on the way up had been of the usual type to be found in the forest country along the Yarra valley—hazel, musk, mulberry, blanket-wood, Christmas-tree, &c., among the remains of an old eucalyptus forest long since vanquished by fire and axe; but, owing to the wet state of everything, we had to be content with observing it from the tram. Just where we left the tramway were two or three beeches, *Fagus Cunninghami*, popularly known as myrtles. Other and extensive myrtle groves are in gullies of this mountain, but our way did not bring us near them. The track now turned to the west, compelling us to face the showers. Winding along the face of the range, in about a mile we struck the old Marysville mining track, and found that the construction of the new

track ended there for the present. In a few yards we crossed a small stream, one of the heads of the Yithan, which a little higher up emerged from a grove of beeches, where, on our return, a number of seedlings were secured for home cultivation. We were now fairly on the crest of the range, which apparently forms a considerable plateau, with an average height little less than that of Donna Buang itself (4,080 feet). On this plateau was the sight of the day—one worth all the trouble of getting there, notwithstanding the wet. The little Ivy-leaved Violet, *Viola hederacea*, was flowering in millions, and monopolizing acres of ground. It at first glance appeared like masses of snow drifted against the stones or fallen trees, &c. The flower-stems were longer than usual, and so closely crowded together that a score of flowers might be gathered in one handful. At about a mile from the little creek the track led us up a stony hill, which turned out to be the vantage spot we had come so far to seek—about 3,500 feet above our starting-point, Warburton. Just then occurred the only break in our misty surroundings which happened during the day. We ascended the look-out, which, utilizing the standing trunks of four tall trees, enables one to get another thirty or forty feet above sea-level On a fine day the view would doubtless be very extensive, but on this occasion few of the mountain peaks could be recognized with absolute certainty. Juliet, four or five miles away to the north-west, was the most prominent. To the north-east was our clearest outlook, where what we took to be Mount Arnold, near Marysville, appeared as a prominent peak. As it was past mid-day, the shelter of some felled timber was sought, so that we might dispose of our luncheons in comparative comfort. This being accomplished, mementos in the shape of specimens of the dacite outcrop were secured by those who think nothing of adding a few pounds weight to their burdens. We retraced our steps more rapidly than we had made the ascent, for the rain still persisted, noting but little in the way of unfamiliar vegetation, except a solitary specimen of an Eriostemon, which could not be found when sought afterwards for identification. Near the junction with the mining track the party became separated — two returned the way they had come ; the others got on to an old timber track, which brought them out at the mill. It proved a sloppy walk, but led them through some good vegetation, which they greatly regretted could not be explored on that occasion. At the mill we re-united, and our troubles were over, for the weather cleared, and, taking a shorter track down the mountain, we were soon back at the hotel having afternoon tea before starting on the return journey for town. At Yarra Junction Messrs. Barnard and Kershaw left us, as they wished

to try the possibilities of the valley of the Little Yarra and of the Mount Beenak district from a natural history point of view. They tell me the next day turned out beautifully fine, and they had a very interesting ramble. Taking the Gilderoy road as far as Slaty Creek junction, they followed the latter road through a rugged gorge as far as Hazeldene, when they followed the Beenak Company's timber tram for some miles through well-timbered, hilly country to Mount Beenak, just before reaching which the tram passed through a patch of hazel scrub right on the summit of the range, at an altitude of fully 2,000 feet. On emerging from the scrub a pretty scene of tall trees and tree-ferns presented itself in probably the head of M'Crae's Creek. An interesting plant in bloom was *Scævola æmula*, one of the Goodeniaceæ, with pale blue and yellow flowers. Returning by a different tram down the mountain-side, they crossed one or two pretty creeks and passed through a thicket of *Banksia collina*, eventually reaching the Gilderoy road at Hackett's Creek, about two miles from where they had left it in the morning. They regard the district as well worth the attention of botanical collectors, and, from the wealth of silver wattles along the Little Yarra, consider it should repay a visit towards the end of August, if only to see that tree in bloom. The leader took his leave of the remainder of the party at Warburton, and crossed country northerly to Healesville, there to join a geological member of the Club in a canoe trip down the Yarra to study its botany and physiography, and on these points should have something to say at a later date.—A. D. Hardy.

FURTHER NOTES ON THE MUTTON-BIRDS OF BASS STRAIT.

By Joseph Gabriel.

(*Read before the Field Naturalists' Club of Victoria, 15th Jan.*, 1912.)

The untold numbers of Short-tailed Petrels, *Puffinus brevicaudus*, Temm., popularly known as "Mutton-birds," frequenting the islands of Bass Strait and the adjacent shores, towards the end of each year, for breeding purposes, is one of the most interesting ornithological features in the Southern Hemisphere.

Before commenting on the reports which have lately appeared in the newspapers about the alleged cruelty to these birds during the laying season, I will briefly refer to a few facts which have been previously mentioned before this Club.

Firstly, the enormous flight noticed by Flinders on 9th December, 1798, while sailing near the Three Hummock Island, at the western entrance to the strait—which, by approximate measurement, he computed to number not less than one

hundred million birds. If, however, we work out his calculated measurements, we find his estimate too low, and that it will bear the addition of an extra thirty-two million birds! So he was well within the mark. Secondly, we have the fact of the inhabitants of the Furneaux Group of islands, at the eastern end of the Strait, annually killing no less than 800,000 of these birds for food and sale, this harvest being practically their principal means of livelihood. Then, again, the islands of the Hunter Group, though in a lesser degree, yearly supply a large number of young birds for food. And, lastly, the rookeries on Phillip Island provide a large number of eggs and birds—fortunately not many of the latter—to the residents and fishermen of Western Port.

Now, I have repeatedly been asked the question—With all this drain, are the birds getting less? After an experience and close observation of nearly thirty years, I must emphatically say—"No." And my reasons for saying so are, shortly, as follows:—

The residents of the Furneaux Group gather annually no less than 200,000 birds from Humpy or Chappel Island alone. They gather very few eggs there, but take some of the old birds during the egging time instead; yet, in spite of this seemingly suicidal policy, every year the birds appear as numerous as ever. The same can be said of the Hunter Group, where there are several rookeries. When representatives of our Club visited the Kent Group in November, 1890, we landed on North-East Island on the 23rd of that month, and found all the available nesting sites occupied by these birds. They were so thickly placed that when in one instance I lifted up a bush I found three birds on eggs within a space of less than a square yard. And yet on 25th November, only two days after, three fishermen—Mr. Carstairs and his two sons—landed on that little island and gathered no less than ninety-three dozen eggs. These eggs Mr. Carstairs assured me were found on the surface of the ground, and were, of course, deserted. They had no need to molest the birds in the burrows or under the bushes in any way; and in all probability many more eggs might have been found for several days after.

Now, it stands to reason that the natural instinct of these excess-laying birds would lead them to hunt for fresh grounds. North-East Island is very small, and has but a limited space suitable for these birds. At the most one thousand birds would more than crowd the available ground; yet we find that over eleven hundred have had to part with their eggs on account of being unable to find nesting-places.

Let us come nearer home, to the Phillip Island rookeries. Year after year, for over thirty years, to my knowledge, the

fishermen and a few residents of Western Port have taken an annual gathering of Mutton-bird eggs. They also take a few birds—I advisedly say a few birds, for our people do not take to the flesh like the people of the Strait, who can get little else.

During recent years many visitors have gone to Cape Woolamai during the laying season to see the wonderful sight of the incoming and outgoing of the birds. On 23rd November last no less than one thousand people were said to be there, principally for that purpose. The bulk of these people went away disappointed, for the birds, as in the previous season, were two days late. Nevertheless, the rookeries were duly robbed and the usual large number of eggs taken. Fortunately, 30th November is the last day, as after that date egg-gathering is tabooed by the eggers. The fact, however, remains that in a few days you will find an egg in nearly every hole. Some years ago I was on Cape Woolamai on 10th December, and picked up over three dozen eggs which were lying outside the holes; there were also a number lying about half-eaten by lizards, &c. On 5th December last, while at Murray's Rookery, I picked up ten loose eggs, and this in spite of the fact that Mr. Dixon's children were daily gathering the loose eggs. I have written to Mr. Dixon since then, and in reply he says that "his youngsters gathered three dozen eggs." Now, this rookery had been well robbed of its eggs up to 30th November. I tried a number of holes, and found them all occupied, the petrel smell being very pronounced. "Nature does not make mistakes" is the old-time saying. If you dissect one of the birds which has been robbed of its egg, you will find one or more following eggs. This sufficiently accounts for eggs in every hole.

I have watched the flights at night on Chappel Island, on the Stacks, and on Phillip Island, and the story is alway the same—excess of birds and extreme quarrelling for the possession of the holes.

About twelve years ago, while steaming along the East Coast of Tasmania, we passed enormous numbers of these birds, together with a fair sprinkling of Stormy Petrels.

If we take Flinders' estimate of one hundred million birds, and, dividing it by four, reduce it to twenty-five millions, then say 1,500,000 are destroyed every year, we cannot but conclude that the overplus over and over again makes up for the birds and eggs taken.

Once again, when our late enthusiastic member, Mr. H. P. C. Ashworth, and myself were on the Stacks in October, 1905, the Mutton-birds were clearing out their holes—this was unusual, as September is the regular month for this work. Later on I heard from Mr. North and others that enormous numbers of dead birds had been seen on the New South Wales beaches

nearly as far north as Sydney, and I found upon inquiry that there was a great scarcity of "whale-food" (small molluscs belonging to the class Pteropoda) about that year. As this is the birds' principal food, it sufficiently accounts for this great mortality. Yet, in spite of this, in two seasons afterwards we found the birds on the rookeries as numerous as ever. This was the only year I recollect the birds being reported as short, which, as starvation was the sole cause, cannot be wondered at.

Coming now to the more controversial part of my paper—the paragraphs which recently appeared in the newspapers :—

MUTTON-BIRDS.—DISAPPOINTED COLLECTORS.

Wonthaggi, Monday.—The Mutton-birds can usually be expected to come into Phillip Island about the same day every year, as Cape Woolamai is the hatchery they have always frequented. The birds were expected on about 23rd or 24th November, and several parties proceeded from Wonthaggi on Saturday in order to collect the eggs. There was a large crowd on the island from other parts of the State. The majority, however, were doomed to disappointment, as up to the present very few birds have arrived, and very few eggs were gathered. This is said to be due to the fact that the wind has not been favourable to bring in the birds. Some people hold the opinion that last year the eggs were collected in such numbers and the birds slaughtered to such an extent that if the same thing continued for a year or two the birds would become extinct. A great many favour a proposal to make Cape Woolamai, the Mutton-birds' home, a sanctuary for them.—*Herald*, 27th November, 1911.

Inquiries are being made by the Game and Fisheries Department into the destruction of Mutton-birds at Cape Woolamai, and it will submit a report to the Government on the matter. The Department had its representative at Woolamai during the time in which the wanton destruction of birds was complained of, and the police should have been present also. From 1902 to 1906 a proclamation was in force protecting Mutton-birds at the two principal nesting-places at Phillip Island, but they are not now protected at all. The Department considers that as Cape Woolamai is the principal nesting-place, it might well be closed, and if the birds are protected in this place it is likely that a similar step will be taken in regard to Phillip Island. Recommendations are shortly to be submitted for the protection of the birds.—*Age*, 30th November, 1911.

MUTTON-BIRDS AT WOOLAMAI.

The proposal to proclaim Cape Woolamai a sanctuary for bird life is regarded with great favour by field naturalists. Cape Woolamai is one of the last strongholds of the Short-tailed Petrel, or Mutton-bird, on the mainland, and the rookery, it is considered, should be protected before it is too late. At a recent meeting of the Field Naturalists' Club of Victoria, Mr. E B. Nicholls read a paper describing a trip to the Bass Valley, in which he referred to the Mutton-birds on Woolamai, and advised that some measures be taken for their protection. Mr. Nicholls states that many residents of Wonthaggi are in the habit of visiting the rookery, and do much damage. Young birds are taken from the burrows and roughly handled, while others are carelessly trampled upon. A man at Wonthaggi was overheard saying that he was "looking forward to good sport on Cape Woolamai." One reason for the reservation

of the rookery is that it is a remarkable sight. The Mutton-birds of Bass Strait, like the Gannets of Cat Island, are famous among naturalists in all parts of the world. The question of Cape Woolamai and its bird inhabitants will be considered by the Bird Observers' Club.—*Herald*, 29th November, 1911.

For purpose of reply, these can be taken together. On 24th November last, accompanied by Mr. A. J. North, of Sydney, I paid a visit to Murray's Rookery, where the first thing we found was a dying bird. Indignantly, we at once made inquiries, without satisfactory results. Two eggers, Messrs. W. Walton and G. Lock, were at work, and, knowing these men were incapable of such destruction, it remained a puzzle to us for the time. The bird had not been ripped open for its egg, but had a longitudinal tear along its neck. We collected three eggs that day. At night we saw the birds coming in, but they were principally the male birds, to do the final cleaning-out of the burrows. The birds, as in 1910, were two days late.

On the following Tuesday I was grieved to read the *Age* report about the alleged cruelty to the birds. I was up in arms at once, and made it my business to make every inquiry, with the following result :—Mr. M'Phee and party, five in all, who were on Cape Woolamai, saw no cruelty. Mr. W. Walton and party, three in all, indignantly commenting upon the report, said that in the rookery which they were working they saw nothing to object to. Mr. Walton says :—"A man is a fool to cut open a bird for its egg, being loss of time. He could gather three or four other eggs while doing it ; besides, if you put the bird back in the hole you get an egg next day." The police constables from San Remo and Cowes were on the rookeries, but in plain clothes and with crooks, so as to allay suspicion. I met the Cowes man going home, and spoke to him afterwards. He said he saw no cruelty. Mr. M'Phee tells me that several others were on the watch at Cape Woolamai, but who they were he did not know.

That there are dead birds lying about the rookeries I do not deny ; but there are also barbed-wire fences. To these, I feel sure, can be attributed the death and mutilation of a very large number of the birds thus found. My friend, Mr. J. Walton, told me that "he was on the Cape Rookery at night, gathering stray eggs with the aid of a lantern, and that this year the birds were thicker than ever ; they were running about his feet like rats, and were constantly flying against himself and lantern. When daylight appeared he found seven birds impaled on the barbed-wire." This remark did away with our mystery of Murray's Rookery.

Again, on Burton's Beach, while in company with Mr. A. J. North and a resident friend, we picked up two dead birds,

which my friend at the time thought had been shot ; but there is not much doubt that the barbed-wire about was the cause of death. This beach is about three miles away from Murray's, the nearest rookery. Formerly there was a small rookery of about a dozen or two holes there, but the ubiquitous rabbit has asserted himself, and the birds have practically deserted the spot. After close hunting, we found three eggs—one in a hole, one outside a rabbit-burrow, and the third was taken from one of the dead birds.

Again, on 4th December, while picking up stray eggs on Murray s Rookery, I found several dead birds which had undoubtedly suffered the same fate.

Now, I appeal to my fellow-members, is not this a reasonable explanation of the death of these birds ? Some people will say that there are places on Cape Woolamai that are free from these fences, but the birds can mortally hurt themselves and still fly for considerable distances before they succumb.

I do not deny there are isolated instances of cruelty, but in all justice to the legitimate eggers I must say that they indignantly repudiate having anything to do with it. Woe betide the man who is found by them doing crooked things ! The last two who were caught by them, ten or twelve years ago, had the option of going over the cliff or going home. They were very glad to choose the latter, after paying a fine as well. In the past dogs have been found worrying the birds, but a "police notice" was sufficient to stop that.

The fishermen of Western Port during late years have had but a precarious living, and the little harvest of eggs which some of them secure is very acceptable, meaning bread and butter for their little ones. The eggs are sold at 9d. per dozen, and a man has to be an expert egger and work very hard to gather sufficient to return him 10s. per day for the four or five days available for the harvest.

I think it behoves us to carefully consider the proposed question of closing the rookery at Cape Woolamai, which is the largest on Phillip Island. Personally, I am not in favour of it, as I consider it is unnecessary. I think I have shown that the taking of the eggs makes little or no difference ; but I agree that there should be some check as to methods of taking young birds. One Hastings man boasts that he takes 1,500 birds every year, and spreads a net to catch the outgoing birds. This, I contend, is not fair.

Though I see no necessity for strict measures at present, in view of a possible scarcity in the future I would suggest that there be—

1. Rigid protection for eggs after 30th November.
2. Strict registration of names of eggers and bird-gatherers.

3. That no nets be allowed to be used for taking young birds.
4. That no dogs be allowed on rookeries.

With these simple precautions, I consider the wonderful yearly assembling of the Mutton-birds at their breeding-ground will remain one of the ornithological sights of Southern Australia for many a year.

"THE AUSTRAL AVIAN RECORD."—Such is the title of a new publication, the first number of which, dated 2nd January, 1912, we have just received for review. Its object is more clearly explained by the full wording of the cover—"A scientific journal devoted primarily to the study of the Australian avifauna — issued in connection with the Austral Avian Museum, Watford, Herts., England — Editor, Gregory M. Mathews—price 1s. 6d. net—Witherby and Co., 326 High Holborn, London, W.C." The number under review consists of 24 pages ($5\frac{1}{2}$ x $8\frac{1}{2}$), and is devoted principally to a revision of the nomenclature of Australian cuckoos, unsigned, but we presume by the editor, in which many drastic changes are made, and trinomials freely introduced—the latter, perhaps, not without reason. Certainly, Mr. Mathews' words on page 2—"I could not separate the members of the latter genus (referring to *Cacomantis*) save by slight difference in size and colouration, which I do not consider to be generic characters"—appear to indicate that he is taking every care to prevent undue multiplication of genera: but his attitude towards species and the "priority of naming" fad in its strictest form seems to be in the opposite direction. A marked change in nomenclature is that the Black-eared Cuckoo, originally named by Gould *Chalcites osculans*, but latterly known as *Misocalius palliolatus*, Lath., now becomes *Owenavis osculans osculans*, Gould. Unfortunately, Gould has gone the way of all flesh, and cannot enter a protest, but we think drastic changes like this should only be undertaken by a council of expert ornithologists. Mr. Mathews does not say how or why he coined the word *Owenavis*—probably after some friend or relative: surely the world-esteemed palæontologist is not intended to be thus honoured. The cover bears a representation of a bird, presumably a Native Companion, which, by the way, according to Mr. Mathews, is henceforth to be known under the generic name of *Mathewsia* instead of *Antigone*. When will this change of name craze cease? The institution of the *Record* will, however, be a distinct advantage to ornithologists, as it may be expected to contain the numerous changes foreshadowed by Mr. Mathews, instead of these being scattered through various publications.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th March, 1912.

In the absence of the president and vice-presidents, Mr. G. A. Keartland was voted to the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From the Tasmanian Field Naturalists' Club, enclosing particulars of the club's camp-out to be held at Maria Island at Easter.

From the Girls' Realm Guild of New South Wales, forwarding schedules of the Australian Wild Flower Show to be held in Sydney in September next.

From the Engineer-in-Charge of Ports and Harbours, stating that the Commissioner of Public Works had granted the use of the motor-boat "Premier" for the Club visit to Coode Island, provided the working expenses are paid by the Club.

REPORTS.

In the absence of the leader, Mr. F. Wisewould, the report of the excursion to Pakenham on Saturday, 17th February, was read by Mr. J. Searle. Considering the hot, dry weather, the excursion had been fairly attended, and though nothing of particular interest had been noted, the members were pleased with the outing. The party was greatly indebted to Mr. and Mrs. Wisewould for their hospitality, and on the motion of Messrs. Barnard and Searle a vote of thanks was unanimously passed to them for their kindness.

A report of the excursion to Kilby Lagoon, East Kew, on Saturday, 9th March, was given by the leader, Mr. J. Stickland, who reported a rather small attendance of members, but a fair amount of good material had been collected, which would probably yield some interesting forms of pond life when thoroughly searched.

A report of the junior excursion to the Botanical Gardens on Saturday, 2nd March, was given by the leader, Mr. F. Pitcher, who reported only a small attendance of juniors, the day being very warm. Attention had been given to the characters of trees, and a number of the more interesting specimens in the gardens visited.

ELECTION OF MEMBER.

On a ballot being taken, Mr. C. V. Quinlan, F.R.G.S., State

Forests Department, Melbourne, was duly elected an ordinary member, and Master Carl Glance, 72 High-street, St. Kilda, an associate member of the Club.

GENERAL BUSINESS.

There being no other nomination, Mr. W. G. Mackintosh was declared elected to the vacant position of assistant secretary and librarian.

PAPERS READ.

1. By Messrs. G. A. Waterhouse, B.Sc., F.E.S., and G. Lyell, F.E.S., entitled "Descriptions of and Notes on Some Australian Hesperidæ."

The authors described as new species, under the names of *Anisynta tillyardi* and *Ocybadistes affinis*, two species of "skipper" butterflies recently captured at Ebor, Clarence River district, New South Wales, and Kuranda, Queensland, respectively, and gave some notes on *Hesperilla dominula*, Ploetz, also from the Clarence River district. Two butterflies which had been described in the *Victorian Naturalist* for August, 1903 (page 56), as varieties of *Trapezites maheta*, Hew., were raised to specific rank as *T. phigalioides*, Waterhouse, and *T. iacchoides*, Waterhouse, respectively.

2. By Dr. C. S. Sutton, entitled "Further Notes on the Sandringham Flora."

The author said that through the kind assistance of several correspondents he was able to add a few species to his list of the Sandringham flora published in the *Victorian Naturalist* for May last, and remarked that the area covering a similar flora to that of Sandringham was much larger than he had at first considered. He also gave a *résumé* of the methods proposed by Clements in a recent work, "Research Methods in Œcology," for estimating and recording the plants of a given area.

Dr. T. S. Hall, M.A., in congratulating the author on the attention he had given to a very interesting subject, remarked that his former paper was one of the most important read before the Club. He referred to the difficulty of following Schimper and other writers on plant œcology owing to the number of technical words used, and which were often unexplained by the text, and demonstrated by means of a blackboard sketch the reasons for isolated patches of Sandringham plants, showing the relations between plants and geology.

Mr. F. G. A. Barnard considered that the Sandringham flora once occupied a small portion of Kew, and mentioned having collected the fern *Gleichenia circinata* near the Rosstown railway at Glen Huntly.

NATURAL HISTORY NOTE.

Mr. C. J. Gabriel referred to the fact that Messrs. Cox and

Hedley had recently described a Victorian land-shell from Smythe's Creek, Otway Ranges, as a new species, under the name of *Paryphanta compacta*, and called attention to his exhibit of specimens of the shell, together with the well-known form *P. atramentaria*, Shuttleworth, for comparison.

EXHIBITS.

By Mr. F. G. A. Barnard.—Living specimen of Native Beech, *Fagus Cunninghami*, collected on Donna Buang excursion.

By Mr. C. J. Gabriel.—A rare exotic cowry shell, *Cypræa hidalgoi*, Shaw = *C. leucostoma*, Gask.; also a new Victorian land-shell, *Paryphanta compacta*, from Otway Ranges.

By Professor Ewart, D.Sc.—Dried specimen of *Calycotome spinosa*, Link., Spiny Broom, collected by Mr. C. French, jun., on the cliffs at Mornington. A native of Spain, but now apparently establishing itself in Victoria.

By Mr. J. Searle.—Insects collected on Pakenham excursion.

By Mr. P. R. H. St. John.—Carpological collection of Victorian eucalypts (containing 64 species and varieties).

By Mr. J. R. Tovey.—A variegated form of the Dense Rice-flower, *Pimelea phylicoides*, Meiss., from Cheltenham.

After the usual conversazione the meeting terminated.

Little Water-Crake.—During the last Christmas holidays numbers of the Little Water-Crake, *Porzana palustris*, Gld., were breeding on a swamp near Lilydale. Years ago these birds bred in the clumps of rushes at the St. Kilda end of the Albert Park Lake, which was probably their nearest breeding-ground to Melbourne since its occupation by white men.—C. French, Jun. 19th January, 1912.

A Plague of Beetles.—While on a visit to Somerville during the recent spell of hot weather, I was surprised to see the beetle *Lagra grandis* flying about simply in thousands. They caused no end of annoyance by flying on your clothes and crawling down your neck as you walked through the bush. At the bases of the eucalypts there were masses of these beetles. It was certainly the most wonderful sight I have ever seen in the entomological line. My friend, Mr. George Shepherd, the well-known ornithologist of Somerville, writing later, says:—"The insects are always common here, but not in myriads like this season. They were flying before the north wind in swarms like bees, and lodging on the tree-trunks and then clustering on the shady sides of the forest trees, where they could be shovelled up. They have disappeared since the weather changed."—C. French, Jun. 14th February, 1912.

TWO BOTANISTS IN THE CRADLE MOUNTAINS, TASMANIA.

By G. WEINDORFER.

(*Read before the Field Naturalists' Club of Victoria, 12th Feb.*, 1912.)

IN January, 1909, I had the great pleasure to visit, in company with my friend, Dr. C. S. Sutton, for the first time the Cradle Mountains, which appeared to me then a veritable flower garden, a true Eldorado for the botanist, and a magnificent place for the tourist who is content to sleep on the hard ground with canvas over him or in one of the fairly numerous hunters' huts.

My vivid description of that trip to my wife, also a botanist, had the effect that both of us, with another admirer of nature, Mr. Ronald Smith, set out on the 28th December, 1909, *via* Wilmot, on the road to Middlesex, where we arrived the same day at 7.40 p.m., welcomed by the station manager and his wife. The Cradle Mountains, it may be mentioned, are situated in the north-west corner of the central basaltic area of Tasmania, and lie about 50 miles due south of Burnie, or the same distance south-west of Devonport.

Already, on nearing the plains, the "Ahs!" and "Ohs!" over the numerous new finds, among which I wish to refer in particular to the Mountain Rocket, *Bellendena montana*, found no end, and reiterated again and again far up to the snow-fields, their echoes seeming to linger even around the dried specimens. The transition from the lowland to the highland flora is, of course, not abrupt, and both of them seem to fraternize in a most neighbourly fashion all over the wide, grassy plains of Middlesex (about 2,500 feet). There we can see, in the grassy sward composed of *Deyeuxia quadriseta* and *D. forsteri*, *Poa cæspitosa*, *Agropyrum scabrum* and *A. pectinatum*, *Pentapogon Billardieri*, *Anthoxanthum odoratum*, *Deshauyssia cæspitosa*, *Echinopogon ovatus*, *Trisetum subspicatum*, *Microlæna stipoides*, and *Danthonia pauciflora*, the yellow-flowering *Craspedia Richea*, the everlasting *Helichrysum bracteatum* and *H. scorpioides*, *Helipterum incanum* and *H. anthemoides*, *Brachycome scapiformis*, *Celmisia longifolia*, and *Ranunculus hirtus*. Everywhere show the pink flowers of *Trachymene humilis* through the sheltering grass, and the banks of the numerous little streams appear to be mostly favoured by the presence of little bushes of *Richea Sprengelioides*, *Epacris lanuginosa*, and *Sprengelia incarnata*. Patches of *Gunnera cordifolia* are not advisable to be stepped upon, for their inveterate liking for boggy places, which in most cases are also preferred by *Astelia alpina*. Numerous blocks of stone, weather-worn and covered with lichens, are at their

bases overgrown by *Muehlenbeckia axillaris*, and over the drier parts of the plains, where an open gum forest offers shelter to plants which seem to require such, are found clusters of *Olearia myrsinoides*, *Hakea microcarpa*, *Coprosma Billardieri*, and *C. nitida*, with here and there a specimen of waratah, *Telopea truncata*, and *Pittosporum bicolor*—the last-named, strange to say, in lower elevations, as far as I have noticed, preferring swampy ground. Tiny specimens, such as *Botrychium lunaria*, *Coprosma Moorei*, *Haloragis depressa* and *H. micrantha*, *Colobanthus Billardieri*, *Actinotus Moorei*, *Mitrasacme montana*, and *Scleranthus biflorus*, are occasionally met with.

Unpropitious weather conditions setting in with the early morning of the 29th did not invite extensive walks; a warm fireplace, with now and then a little outing, was more congenial. So it came that our further advance did not take place before the 31st, when we, following an invitation of Mr. W. Black, of Lea River, to stay at his newly-erected hut at the Fiery mine, at the foot of Mount Remus, started in reality amongst the mountains with two pack-horses and a Mr. Perry, whose love for the bush had kept him several years in this locality. The track to this lately-discovered galena mine leads up the plains in sight of the Iris River as far as the western boundary of the V.D.L. Co.'s land, where the newly-blazed track into the Cradle Mountains was followed for about two miles. An undefined track from there to the right—leading over button-grass marshes, with *Gleichenia dicarpa* and *Xyris gracilis*, now through bushes of *Orites acicularis*, waratah, and *Leptospermum myrtifolium*, now over barren country in which the *Bossiæa cordigera*, *Pultenæa subumbellata*, and *Bellendena montana* flourish—brings us, all the time gently rising through a cluster of *Fagus Cunninghami*, on to the northern end of Hounslow Heath, which, absolutely devoid of tree growth, stretches for miles towards the Cradle Mountains, their crags clearly displayed on the horizon. The Heath, narrowing at that point, was soon traversed, and, enjoying the varied sight of mountains and the sombre shade of their wooded gullies, we descended to the Fiery River, some 200 feet, and reached the hut at 12 noon. The same afternoon was spent botanically exploring the Fiery River as far as the M'Intosh Gorge, and on 1st January Mounts Romulus and Remus were visited, the flora not differing in detail from that of the Cradle Mountains, with the exception of that of the higher altitudes of the latter, which were our main object.

It was soon manifest that the Fiery hut, though very comfortable, was too far from the Cradles to use the place as an operating basis. To shift camp into the Cradle valley was unanimously decided. The morning of the 2nd saw two men,

with some of the camp outfit packed into swags, leaving the Fiery *via* Hounslow Heath for Crater Lake, from where they returned the same night, agreeably surprised by the appearance of the owner of the hut, who, as horses and man had been sent back to the station, was a welcome addition to the party. So, strengthened by one swag-carrying unit, we set out on the morning of the 3rd at 9 a.m., taking with us the most important articles, abruptly rising along the creek until, at the foot of Mount Remus, Hounslow Heath was reached. This heath, about five miles long, and in its widest part three miles wide, is in its greater part covered with button-grass, which, through repeated burning-off by prospectors and hunters, was obliged to abandon its monopoly and to make room for native grasses, among which, here and there, some mountain daisies and *Celmisia longifolia* struggle for their existence on this desolate, wind-swept, high plateau (3,000 to 3,800 feet). Our direction towards the Dove valley brought us in a south-east course to the cutting of Pencil-pine Creek, which is here and there relieved of the monotonous surroundings by little clusters of the Pencil Pine, *Arthrotaxis cupressoides*.

The day being beautiful, and that glorious mountain air, combined with the fact that every step brought us nearer and nearer to the lofty mountains, was decidedly instrumental in helping us along at a fair pace. So it was that we reached, at 1 p.m., in the Dove valley, the track leading to the Cradle valley, about two miles from its entrance (2,930 feet). The slope of Dove valley, on which we had to descend, is prettily wooded with an open forest of gum-trees, interrupted here and there by stretches of pine forest, beech, and sassafras—as a rule indicating the course of a little creek—open patches in the valley displaying a luxuriant growth of *Diplarrhena moræa*.

At our camp, chosen the day before, at Crater Lake (3,470 feet), we arrived at 4 p.m., and soon all hands were busily engaged in pitching the tents and to provide for general comfort in a primeval way. If it had not been for the magnificent sight which the cliffs, towering over the little mountain lake, displayed to us, or the wide view offered in the opposite direction down into the grassy lands of Cradle valley, the place we had selected for a week's stay could hardly be called a good one. Twisted and gnarled gum-trees, their stems and branches seemingly turned round their own axis like the winding stem of some gigantic climber left standing without its support, silently disclosed to us the fact that our place in stormy weather was nothing but a wind-hole, which, luckily for us, preserved its silence during our stay. But two advantages were obvious—the one, that all the surrounding lower scrubs, mostly consisting of *Bæckia Gunniana* and *Epacris lanuginosa*, were

burned out some time before our arrival; the other, that the place was admirably centrally situated.

With the early morning of the 4th work was begun in earnest, and at 7 a.m. a start made for the roof of Tasmania. Taking the somewhat steep ridge between Dove and Crater Lakes, soon a real alpine flora presented itself on our way to higher elevations. Over stones and rocks trail the graceful branches of *Microcachris tetragona*, *Podocarpus alpina*, and the straggling *Exocarpus humifusa*, apparently used to any sort of weather and temperature. In the shelter of rocks were sure to be found the white-flowering *Ozothamnus ledifolius* and *O. Backhousii*, *Richea acerosa*, and everywhere the pink-flowering *Boronia rhomboidea* and *B. pinnatifida*, var. *citriodora*, and *Tetratheca pilosa*. With the first steps on to the plateau, extending over to the crags of the mount, a marked change in plant-life occurs, bushes almost entirely disappearing, and what was there of them being rather more a convenient base for mosses and lichens than for the purpose to preserve their own species. Better fare in this locality those true children of our alpine flora, which, on account of their pronounced liking for cold climates, have in a geographical sense received the name of glacial plants. Here, in these weather-worn surroundings, never safe from frost, *Ranunculus Gunnianus* displays to us its red and yellow flowers, masses of the white-petalled *Anemone crassifolia* look down upon their tiny neighbours of the lofty heights, the composites *Helichrysum milligani* and *H. pumilum*, *Erigeron pappachroma*, *Raoulia planchani* and *R. Meredithæ*, *Gentiana saxosa*, the little white-flowering *Pentachandra pumila*, and *Abrotanella scapigera*. The curious epacrid, *Dracophyllum minimum*, forming hard cushions through each individual member closely adpressing to the other, most likely in order to most effectually preserve the scanty supply of warmth, is frequently met with.

On we go, here and there halting to impress upon the memory the characters of this new and interesting plant association, or to study the general aspect of the distant wooded surroundings or that of the cheerless heath over which we came the day before, or the Dove Lake's shores beneath us, its blue waters pleasantly relieving the sombre shadows of the surrounding pine forests. Soon we arrive at the foot of the crags, where, in their shelter, a little cluster of bushlets, so to speak, forms the last outpost of a compound bush vegetation, their wind and weather-defying members composed of *Richea scoparia* (with their sharp-pointed leaves also man-defying), *Orites revoluta* and *O. acicularis*, *Cyathodes straminea*, *Bœckea Gunniana*, our only deciduous beech, *Fagus Gunnii*, and *Tetracarpæa Tasmanica*,the whole in places over topped by *Richea*

pandanifolia. Slowly we ascend, collecting among the masses of stones and boulders the graceful fern *Lomaria alpina*, *Azorella dichopetala*, *Oreomyrrhis audicola*, *Gaultheria antipoda*, and *Ourisia integrifolia*. Arrived at the top of the crags, a detour was unavoidable in order to find a convenient track to the cairn. The collecting of plants had, on account of the absence of phanerogamic plant-life, from this point to be practically abandoned, only unapproachable places exhibiting the vivid green of the leaves of *Milligania densiflora*, *Blandfordia marginata*, and *Astelia alpina*, or, where the snow-fields had opened to the sun's rays little patches of a minimum of humus soil, tenaciously evolved during many hundreds of years by those pioneers of soil-building, the lichens and mosses, *Rubus Gunnianus*, *Cardamine radicata* and *C. dictiosperma*, and *Aciphylla procumbens* had taken over their share in that ever-transforming work of nature.

Arrived at the cairn (5,069 feet), almost every sign of vegetation, with the exception of some small bushes of *Orites acicularis*, with their branches bleaching in the glaring sunlight, was left behind, and the only new discovery made there was that we had amongst us the first lady who ever ascended these lofty altitudes. After a stay for three hours—far too short to completely realize all those wonderful intricacies of nature's grandest architecture—we turned reluctantly and descended, arriving at sunset at our camp.

The following two days of the 4th and 6th were devoted to a visit to two charming mountain tarns and Mount Brown. Setting out from our camp for Lake Lyla and Dove Lake, we sharply descend through a little cluster of *Eucalyptus Gunnii* and *Leptospermum myrtifolium*, stepping out on to the open collecting amongst the button-grass the almost hidden iris, *Campynema lineare*, and *Pterostylis mutica*. Wide stretches of ground are covered with small bushes of the cream and pink-coloured *Melaleuca squamæa*; in rocky places *Gaultheria hispida* surprises us; and where the waters percolate the gently falling ground on broad stretches towards the shores an inexperienced eye would surely overlook, amongst the sward of *Restia complanatus* and *R. australis*, the tiny specimens of *Actinotus suffocata* and *A. bellidioides*, the pink-flowering *Forstera bellidifolia*, *Mitrasacme montana* and *M. Archeri*, and *Abrotanella scapigera*. In the rich dark loamy soil, without the protecting presence of rushes and grasses, display *Claytonia Australasica*, *Drosera arcturi*, and *Oxalis Magellanica*, their snow-white flowers in uncountable masses, occasionally relieved by the red of *Stylidium graminifolium*, the pale pink of *Boronia polygalifolia*, the blue and white star-like flowers of the little *Herpolirion novæ-zealandiæ* growing almost level with the

ground, and making the intruder hesitate to roughly set his foot on them. At the water's edge we find *Persoonia Gunnii*, and one bush of *Anadopetalum biglandulosum* (horizontal), this inhabitant of gloomy mountain gullies apparently here on the open shore quite out of place. The pleasant smell of the flowers of *Cenarrhenes nitida* is rudely dispelled by the offensive smell of its broken leaves and branches. At the overflow of Dove Lake, where from its shore the humus had been washed away, leaving nothing but a mass of fine gravel, *Plantago Tasmanica* and the composite *Senecio pectinatus* had been noticed.

We crossed the Dove River on a fallen log, and turned our steps towards Mount Brown, boldly precipitous towards Dove Lake. Winding our way through low bushes of eucalyptus, we added to our collection *Lyssanthe montana*, *Epacris impressa*, var. *ruscifolia*, *Cyathodes acerosa*, *Leucopogon collinus*, and *L. ericoides*. The rounded top of the mount, almost, so to speak, in possession of *Microcachrys tetragona*, is very poor in variety of plant-life, which improves on descending to the shores of Cradle Lake, where a dense forest of *Arthrotaxis selaginoides* and *A. cupressoides* overtop an undergrowth of *Richea dracophylla*, *R. scoparia*, and *R. pandanifolia*.

The following three days were devoted to collecting in the Cradle valley and its surroundings. The course of the valley lies in the direction from south-west to north-east, receiving in its upper part the snowy waters coming from the drifts on the "plateau." A low divide separates it from a deep gorge, leading to the west into the Brougham Gorge, its northern slope going over into Hounslow Heath, while the beautifully widened eastern part reaches as far as the Dove River, coming from the south, beyond it the slightly undulating plain going over on one side into the slope of Brown Mountain, on the other into that of Mount Brown, the centre forming the entrance to the Campbell Gorge. The upper end of the valley is prettily wooded by a little forest of *Fagus Cunninghami* and *Arthrotaxis selaginoides*, in their shelter growing *Richea pandanifolia* up to 20 feet, the crimson-flowering *Archeria eriocarpa* forming a dense entanglement, which is heightened in places where *Richea scoparia* took possession of the ground. This forest forms, so to speak, the nucleus of the woods extending down on both sides of the valley. The southern part, which is formed by declivities of the Cradle Mountain, is absolutely devoid of pine trees, the only trees forming an open forest being eucalypts. The northern part, at the top end of the valley, covered with *Fagus Gunnii*, goes over into a magnificent forest of beech and pine, the latter, though not developed to considerable heights, displaying at the brim of the forest forms which suggest at

first glance the existence of some park made by human hands. Among these pines, on the bank of a little creek, we found, surrounded by masses of *Lycopodium scariosum*, *Arthrotaxis laxifolia*, which, so far, we had not noticed anywhere else during our stay in the mountains.

The bottom of the valley, where the rivers meet from the lakes, may be justly called a veritable alpine flower-garden. Grassy plains, gradually merging into button-grass towards the higher elevations, have amongst them specimens of *Olearia pinifolia* and *O. persoonioides*. Soil of a sandy character shows everywhere the white flowers of *Bauera rubioides*, *Euphrasia Brownii*, and the gold of *Hibbertia angustifolia*. Numerous pools and stagnant swamps, with large sphagnum beds, are luxuriously overgrown with *Hypolæna fastigiata* and *H. lateriflora*, *Myriophyllum pedunculatum*, Restia Juncus, and Carex, while the river-courses, winding their way along their deep, washed-out beds, are lined by small bushes of *Orothamnus obcordata*, *Olearia lepidophylla*, and the gently-rocking inflorescence of *Pimelea linifolia*, growing in the shade of some trees of *Arthrotaxis cupressoides* and *Fitzroya Archeri*. Wherever we look, *Boronia pinnatifida*, var. *citriodora*, and *B. rhomboidea* are in prominence. Further, *Epacris microphylla*, *E. lanuginosa*, *E. serpillifolia*, the snow of their flowers varied by the scarlet of *Stylidium graminifolium*, the blue of *Thelymitra cyanea*, or the yellow of *Bossiæa cordigera* and *Pultenæa subumbellata*.

The morning of the 10th beginning misty and showery prompted a hurried retreat with our camp outfit to the Cradle hut in the Dove valley, where we arrived at 12 noon; received there, on opening the door, by its solitary inhabitant, a youthful tiger-cat, which showed a distinct preference to immediately evacuate the inner part of the hut in favour of the new arrivals, and to watch proceedings, especially during dinner hour, through some flooring cracks. The afternoon of that day turning out fine, the irresistible Cradle valley was once more visited, and the following days, during which our companion, Mr. Smith, left for home, the neighbourhood botanically explored and *Gaultheria lanceolata* and *Libertia pulchella* secured for our portfolios. On the 13th pack-horse and man arrived, and at 12 noon we set out on the first stage of our homeward journey, following the track down the Dove valley, halting an hour at Pencil-pine Creek, whose open, grassy slopes displayed a charming variety of plant-life. There, the year before, we found the rare little *Œnothera Tasmanica*, which on this occasion we could not detect again. *Epilobium Billardierianum*, growing in the tussocks, associates with a species of Linum, hitherto undescribed, *Leptorrhynchus squamatus*, and *Myosotis Australis*. Amongst the grass, growing along the banks of little streams,

grows *Cotula filicula* and *C. reptans*, the dainty white and blue-flowering *Scævola Hookeri*, *Brachycome scariformis*, *B. cardiocarpa*, and *B. stricta*, *Gratiola nana*, the pink *Geranium sessiliflorum*, *Mentha serpillifolia*, the white-flowering *Claytonia Australasica*, the blue-petalled *Caladenia angustata*, *Cardamine hirsuta*, *Lagenophora Billardieri*, *Haloragis depressa*, *Plantago Brownii*, and on rocks the silvery-leaved *Gnaphalium alpigenum*. The river is lined with *Olearia lepidophylla*, now and again by the pink flowers of *Comesperma retusum*, *Bellendena montana*, and *Blandfordia marginata*, the whole prettily contrasted by bushlets of *Drimys aromatica* and *Telopea truncata*, surrounded by masses of *Chiloglottis Gunnii* and the blue-flowering *Lobelia anceps*.

After again receiving the hospitality of the station people, the day of our ultimate departure arrived with the 14th January, and so ended a botanical tour into the mountains, where every walk appears to be the contents of a book, which stimulates innumerable thoughts and pictures. From the rock, whose weather-worn surface is covered with mosses and lichens; from the alpine flower-gardens, where the gentle kangaroo grazes with its young, up to the gnarled and stunted pines and gum-trees and the crystal, glittering snow-fields, over which the stately eagle soars, are the leaves of this writing of Nature to be seen. The one will read out of this book more, the other less; but all the art of reading rests in this: to analyze and recognize out of the superabundance of appearances and the individual occurrences the eternal law of the whole and the ingenious arrangement of things.

This paper, dealing with our botanical observations, may be considered as a supplement to the illustrated general account of the trip given in the Launceston *Weekly Courier*, 22nd and 29th September, 1910; and, in conclusion, I desire to express my thanks to Mr Leonard Rodway, Government Botanist, for his kind help in identifying the collected specimens.

DESCRIPTIONS OF AND NOTES ON SOME AUSTRALIAN HESPERIDAE.

By G. A. Waterhouse, B.Sc., B.E., F.E.S., and G. Lyell, F.E.S.

(*Read before the Field Naturalists' Club of Victoria, 11th March*, 1912.)

Anisynta tillyardi, n. sp.

Male. Above. Forewing rich dark brown: long hairs of basal third, barely reaching costa, orange-brown: a small subquadrate spot in end of cell, dull orange: a subapical transverse series of three minute dots, dull orange: a pair of very small discal spots in interspaces 2 and 3, dull orange: rarely traces

only of a narrow discal streak in lower edge of interspace 1, dull orange: cilia rich black, sometimes very narrowly dull orange between veins. Hindwing rich dark brown: long hairs of central and basal area, reaching dorsum but not reaching costa, orange-brown: cilia rich black, faintly edged dull orange between veins.

Beneath. Forewing brown-black: costa and apex orange-brown: cell spot as above but brighter orange: subapical dots as above: rarely a very minute obscure discal dot in interspace 3, dull orange: a series of obscure streaks in apex, cream: cilia cream, at veins black. Hindwing orange-brown: a basal and a discal series of irregular small rings, red-brown: a broad streak in cell, a broader between veins 4 and 6, a broad streak in interspace 1*b*, and a streak in interspace 7, cream: a subterminal series of elongate spots, and a terminal series of small spots, cream: cilia cream, at veins black.

Female. Above. Forewing as in male: spots and dots much larger, and often paler: always an irregular discal streak in lower edge of interspace 1: cilia more clearly chequered. Hindwing as in male: usually an irregular spot in end of cell, orange: cilia more clearly chequered.

Beneath. Forewing as in male: cell spot larger and bright orange: subapical dots larger and two nearest costa, cream: discal spots in interspaces 2 and 3 always present, usually slightly larger than above, and bright orange.

Antennae with clubs brown-black above and orange-brown beneath, bent evenly at the middle, and ending in a blunt point: shafts of antennae brown-black, annulated with cream very narrowly above, and more broadly and irregularly beneath. Palpi with third joint short, slender, horizontal: second and third joints clothed above with brown-black hairs sparsely mixed with cream, and clothed beneath with cream hairs tipped with brown-black.

Expanse (one wing). Male, 13–15 mm. Female, 14–16 mm.

Locality. Ebor, N.S.W., in January and December, at 4,000 to 4,200 feet.

Type series (60♂, 25♀) in collections Waterhouse and Lyell.

The species is fairly constant in its markings, only varying in the diminishing of the pale spots of the forewing above, an occasional male having these almost entirely absent. The orange spots, both above and beneath, especially those nearest the margins, pale to almost dull white in worn specimens.

We have dedicated this very distinct and striking species to Mr. R. J. Tillyard, M.A., to whom we are indebted for a fine,

long series. It was taken at an elevation of 4,000 to 4,200 feet, within a few miles of Ebor (Guy Fawkes), on the Dorrigo Plateau. The creeks flowing along the deep gullies of this plateau eventually reach the Nymboida, a large tributary of the Clarence River. The butterfly kept to the gullies, showed a fondness for exploring the precipitous sides of the gorges, and was not noticed wandering over the hill sides above : it seemed to show a distinct preference for mint. The first examples were taken in the closing days of December, and by the middle of January those still on the wing were no longer in good condition.

We place this species in Lower's new genus *Anisynta* (Trans. Roy. Soc. S.A., vol. xxxv., p. 141, 1911) on account of its antennal characters, and the absence of stigma in male. With the exception of the undersurface of the hindwing, it strongly resembles the Western Australian *A. sphenosema*, Meyr. and Lower, to which it is evidently closely allied. The hindwing beneath has a very closely superficial resemblance to the much smaller alpine species *Hesperilla monticolae*, Olliff.

HESPERILLA DOMINULA, Ploetz. Stettiner Entomologische Zeitung, 1884, p. 379.

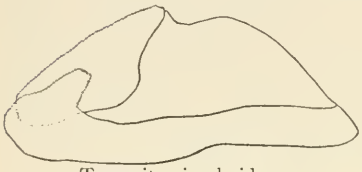
Mr. Tillyard also sent us a long series of this rare species, and after careful comparison, we are now quite sure that *H. drachmophora*, Meyrick, must sink as a synonym. It was taken in the same district as *A. tillyardi*, but at rather higher elevation (4,500 to 4,800 feet). The specimens are in finer condition and somewhat larger than any of the examples from Mt. Kosciusko and Tasmania. The male varies somewhat in the forewing above : this is sometimes a uniform brown but for the darker stigma and the chequered cilia ; sometimes it has a subapical transverse series of three very minute pale yellow dots ; more rarely a minute discal dot in interspace 3 ; and very rarely a small comma-shaped dot in end of cell. The female varies only slightly, and that but in the size of the pale spots.

TRAPEZITES PHIGALIOIDES, Waterhouse. *T. maheta*, var. *phigalioides*, Waterhouse, *Victorian Naturalist*, vol. xx. (1903), p. 56.

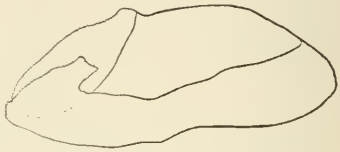
When describing this species as a variety, it was anticipated that it would prove to be the southern race of *T. maheta*, as the females resembled each other very closely. This is not so, for a male example of typical *T. maheta* has since been captured by Mr. Jas. A. Kershaw, F.E.S., at Wilson's Promontory, Victoria. We have now examined the genitalia of *T. maheta*, *T. phigalioides*, and *T. iacchoides*, and we find they show the three to be distinct species. It will be seen from the illustrations herewith that

T. phigalioides and *T. iacchoides* are more closely allied to each other than to *T. maheta*. We therefore have no hesitation in raising the two supposed varieties to specific rank.

Trapezites maheta.



Trapezites iacchoides.



Trapezites phigalioides.

TRAPEZITES IACCHOIDES, Waterhouse. *T. maheta*, var. *iacchoides*, Waterhouse, *Victorian Naturalist*, vol. xx. (1903), p. 56.

When describing this species as a variety, it was known by a single male example only. A series of that sex has since been secured, and Mr. G. M. Goldfinch (to whom we are greatly indebted) took a single female at Como (13 miles south of Sydney) in November, 1911. The silver markings of the underside of the *female* hindwing, and the differing genitalia as illustrated, leave no doubt of its claim to specific rank. We now give a description of the female, the type of which is in the Waterhouse collection.

Female. Above. Forewing dark brown: a large subquadrate spot in end of cell, orange, hyaline, with a small dot above it, orange: a transverse subapical series of three small spots, pale orange, hyaline: a large elongate discal spot in interspace 2, and a much smaller one in base of interspace 3, orange, hyaline: a quadrate spot, before half from base, in interspace 1, bright orange, and a narrow streak along dorsum, pale orange: cilia brown, at veins brown black. Hindwing brown-black: a broad central band bright orange: a faint streak in cell orange: cilia grey-white, at veins brown.

Beneath. Forewing brown: apex broadly and costa narrowly salmon-grey: basal half of cell narrowly pale orange: spots as above, that of interspace 1 paler. Hindwing salmon-grey: a spot in cell, another in interspace 1*b*, and a discal series of six spots (that in interspace 1*b* much the largest), silvery white margined black: cilia salmon-grey, at veins brown.

Expanse (one wing), 19 mm.

Except for the somewhat larger orange spots, the somewhat less acute apex, and the more convex termen of forewing, the female differs but slightly from the male.

The three allied species *T. maheta*, *T. phigalioides*, and *T. iacchoides* and the less closely related *T. phigalia*, will be somewhat puzzling to those collectors who possess but few examples, and the following notes should therefore prove useful.

T. maheta is sexually dimorphic, the male only having the bright silvery spots on the undersurface of the hindwing. *T. iacchoides* has small, but more and differently placed (to *T. maheta*), spots on the hindwing beneath, and they are silvery in both sexes. *T. phigalioides* and *T. phigalia* are without any trace of silvery spots. The female of *T. phigalioides* and in lesser degree that of *T. phigalia*, closely resembles the female of *T. maheta*.

T. maheta is known from Kuranda, in Northern Queensland, to Jervis Bay, and we have a single record as far south as Wilson's Promontory: it has two broods yearly and is taken (in Sydney) from September to April.

T. iacchoides is only known from the Blue Mountains, Como, and Pambula (all in New South Wales), and is single brooded; September to January.

T. phigalioides has been taken at Beaconsfield (1,000 feet) and Gisborne (1,500 feet), Victoria, and at Jenolan Caves (3,000 feet), New South Wales, and is single brooded; November to January.

T. phigalia is taken in Southern Queensland, in the Blue Mountains, and as a semi-alpine species in Victoria, and is single brooded; September to December.

OCYBADISTES AFFINIS, n. sp.

Male. Above. Forewing brown-black: costa powdered orange: an elongate spot in outer half of cell, and a streak along median vein, bright orange: a subapical transverse series of three elongate *confluent* spots, bright orange: a discal band of spots from vein 1 to vein 6, those in interspaces 4 and 5 only half the width of the lower ones, bright orange: a faint streak along dorsum, and a faint streak in interspace 1 orange: cilia brown-black, tips paler, at tornus orange: a discal sexmark from vein 1 to vein 4 dull black. Hindwing brown-black: a broad *straight* discal band of confluent spots, bright orange: cilia orange.

Beneath. Forewing brown-black: a broad spot in end of cell, and costa to beyond end of cell, orange: subapical spots and discal band as above but pale orange. Hindwing dull brown: costa suffused pale orange: an obscure tornal patch

brown: a dot in cell, pale orange: discal band as above but pale orange, and irregularly edged brown: termen with a brown line.

Female. Above. Forewing as in male: spot of discal band in interspace 2 distinctly larger; sexmark absent. Hindwing as in male.

Beneath. Forewing as in male: second discal spot larger. Hindwing as in male.

Antennae above dark brown, beneath orange except tip of club red-brown. Palpi with third joint very slender, short and erect.

Expanse (one wing)—male, 12 mm.; female, 13 mm.

Localities. — Kuranda, Queensland, February to June. Cairns. Queensland, June to August. Mackay, Queensland.

Types in collection Waterhouse.

This species, of which we have 12 males and 9 females, closely resembles *O. marnas*, Felder, but is of such smaller average size. It may be recognized from that species by the spot in interspace 5 of fore-wing above being always present, and the three subapical spots being much larger and always confluent. The orange band of hindwing is also much straighter, and the streak along vein 1*b* is absent. We have had examples of *O. affinis* in our collections for a number of years, but regarded them as small *O. marnas*. When, however, we caught it at Cairns last June, its manner of flight and general habit pointed to its being a species distinct from *O. marnas*, which we caught at the same time. An examination of the male genitalia has placed this beyond doubt.

Our adoption of Lower's genus *Anisynta* makes a reference to his recent revision of the Australian *Hesperidae* (Trans. Roy. Soc. S.A., 1911, vol. xxxv.) necessary. This provides a considerable number of new references, and is a distinct advance upon his previous revision (Trans. Roy. Soc. S.A., 1902, vol. xxvi.) But it is unfortunately marred by the same great carelessness in the proof readings and elsewhere. The author swells the number of his recorded Australian species by three forms of *Tagiades*. though he tells us they are not really distinct, and by the inclusion of foreign descriptions, which need hardly be regarded seriously, as when the types come to be examined they are certain to prove either synonyms or non-Australian. He tells us that the genus *Hesperilla* "is separated from *Mesodina* and *Trapezites* by the absence of the stigma in male" when he means "by the presence." Many such careless errors will need correction before his revision can be accepted as a true guide to the family.

THE

Field Naturalists' Club of Victoria.

FOUNDED MAY, 1880.

MEMBERS,

31st MARCH, 1912

(With Date of Election and particulars of Branch of Study).

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July 1883 BROUN, Captain T., Howick, N.Z.
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Aug. 1884 FINSCH, Dr. Otto, Germany.
Sep. 1889 †LEGGE, Lieut.-Col. W. V., R.A., F.Z.S., M.B.O.U., Melbourne.
Feb. 1893 *†LUCAS, A. H. S., M.A., B.Sc., Grammar School, Sydney, N.S.W.
Aug. 1882 RAMSAY, Dr. E. P., F.R.S.E., &c., Sydney, N.S.W.

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Sep. 1882 PATEY, B. R., Esq., Premier Buildings, Collins-street, M.

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April 1911	Abbott, S. B., Mines Department, Melbourne	
Dec. 1911	Archer, A. O., Trinity Colloge Hostel, Parkville	
Aug. 1885	Andrews, H., 206–208 Flinders-lane, Melbourne	
Oct. 1909	Anjou, Hy., Neerim-road, Murrumbeena	
Aug. 1906	Armitage, Jas. A., 510 Station-street, N. Carlton	
April 1906	*†Armitage, R. W., M.Sc., 441 Canning-street, Carlton	Biology, Geol.
June 1906	†Audas, J. W., F.L.S., National Herbarium, S.Y.	Botany
Feb. 1904	† Bage, Miss F., M.Sc., F.L.S., "Cranford," Fulton-st., St. Kilda	General Biol.
June 1906	Bainbridge, J. W., Crown Lands Dept., M. ...	Botany
Aug. 1889	†Baker, H. H., 78 Swanston-street, Melbourne	Microscopy
May 1880	*o* Bale, W. M., F.R.M.S., Walpole-street, Kew	Hydroids
May 1880	*o* Barnard, F., "Bracondale," Foley-street, Kew	
May 1880	*o* *†Barnard, F. G. A., 49 High-street, Kew	Ent., Bot. (Ferns)

Jan. 1906 Barnett, Miss A. M., P.O., Newport
Dec. 1909 Barr, Jas., 39 Queen-street, Melbourne
Sept. 1899 * † Barrett, C. L., *Herald* Office, Melbourne ... Orn. & Reptilia
May 1906 Bennett, W. J., "Riverside," Davidson-st., South Yarra
Dec. 1907 Bennetts, W. R., Pakington-street, Kew ... Pond Life
May 1880 *o* * † Best, D., 291 Little Collins-street, M. ... Ent. (Col.)
Nov. 1900 † Billinghurst, F. L., National Bank, Bacchus Marsh... ... ... Ent. (Col.)
Nov. 1904 Booth, J., Yarra-road, Croydon ... ... Amphibia
May 1905 Booth, Miss D. E. H., Yarra-road, Croydon
May 1905 Booth, Miss E. S., "Oakover," Bell-st., S. Preston
June 1911 † Brittlebank, C. C., Government Vegetable Pathologist's Department, Melbourne ... ... Ent., Botany
Dec. 1909 Bury, Miss E., "Verona," Argyle-street, St. Kilda
Dec. 1906 † Campbell, A. G., "Fernside Orchard," Pomonal, *viâ* Stawell ... ... Orn., Oology
Mar. 1909 † Carter, T., M.B.O.U., Broome Hill, W. Aust. Ornithology
Dec. 1902 Cayley, F. J., Werribee
May 1902 † Chapman, F., A.L.S., F.R.M.S., Nat. Museum, Melbourne ... ... Geol., Palæon.
July 1902 Clark, Alister, "Glenara," Bulla ... ... Ornithology
Dec. 1908 Clarke, A. Rutter, Orrong-road, Toorak
Mar. 1889 Cochrane, Miss S. W. L., 11 Morang-road, Hawthorn ... ... Botany
Feb. 1911 Code, W. J., Heathcote
July 1882 * Coghill, G., 79 Swanston-street, Melbourne ... Botany
Nov. 1906 † Cole, C. F., 28 Currajong-road, Auburn ... Ornithology
Nov. 1902 Cowle, Miss L., c/o Mr. Priest, Devonport W., Tasmania
Feb. 1910 Crawford, Miss K., 32 Motherwell-st., Hawksburn
Dec. 1910 Cronin, John, Botanic Gardens, Melbourne
Aug. 1905 Cudmore, Mrs., "Springfield," Murphy-st., S.Y.
Feb. 1901 D'Alton, St. Eloy, C.E., Dimboola ... ... Botany
Dec. 1892 Danks, A. T., Bourke-street, Melbourne
July 1902 Davey, H. W., Clarence-street, Geelong West
June 1909 Davis, Miss M., 337 Weston-street, Brunswick
Oct. 1911 Davis, D., Weston-street, Brunswick
May 1910 Deasey, Miss H., Laluma, Brighton-rd., Elsternwick
Nov. 1911 Dines, Miss N., Church M. Soc., Dummagudem, S. India
Aug. 1911 † Dodd, F. P., Kuranda, North Queensland .. Entomology
Nov. 1910 Douglass, Miss A., Mona-place, South Yarra
May 1880 *o* * Dixon, J. E., 50 Swan-street, Richmond Ent. (Col. & Lep.)
Nov. 1911 Dunn, E. J., F.G.S., Pakington-street, Kew
May 1904 Edmondson, C. H., 75 Riversdale-rd., Hawthorn
Dec. 1901 Edmondson, Mrs. C. H., Riversdale-rd., Hawthorn
Dec. 1909 Eltis, R. H. M., Livingstone-street, Ivanhoe
April 1906 * † Ewart, Professor A. J., D.Sc., Ph.D., F.L.S., National Herbarium, South Yarra .. Botany
Sept. 1907 Farr, W. H., Flinders
May 1890 * † Fielder, Rev. W., F.R.M.S., "Croft," Orrong-road, Armadale ... ... Micro. Biology
May 1911 Firth, J., Briagolong
May 1880 *o* * † French, C., F.E.S., Anderson-rd., Hawthorn Entomology
July 1883 * † French, C., jun., Department of Agriculture, Entomological Branch, Melbourne ... Entomology
Aug. 1885 * † Frost, C., F.L.S., Mt. Victor-road, Kew ... Reptilia
Mar. 1901 Fullard, A. F., Barker's-road, Hawthorn
July 1883 * † Gabriel, J., Walmer-street, Kew ... ... Oology
June 1900 † Gabriel, C. J., 293 Victoria-st., Abbotsford .. Marine Conc.

July 1908	Gabriel, J. E., Sale	
Nov. 1889	Gates, W. F., M.A., "Cullymont," Selwyn-rd., Canterbury	
Oct. 1880	*†Gatliff, J. H., Morrah-street, Parkville ...	Marine Conc.
Jan. 1911	Gay, W., Dookie College	
Aug. 1911	Gill, A. J., State School, Cockatoo Creek	
Aug. 1910	Gill, Miss E. C., Bank-street, Box Hill	
April 1909	Gillbanks, Miss G., Normanby-st., M. Ponds	
Aug. 1907	Goodson, W. E., State School, Doncaster	
Feb. 1912	Gladman, F. E., Pt. Nepean-road, Elsternwick	
June 1902	†Goudie, D., Poath-road, Murrumbeena ...	Ent. (Lep.)
May 1902	†Goudie, J. C., Sea Lake, Victoria	Ornith., Ent.
Dec. 1906	Gray, O., Wedderburn, Victoria	
Dec. 1909	Greenwood, Rev. A. J., Linton	
Jan. 1901	Greenwood, G. F., "Garrell," Glen Eira-rd., Caul.	
June 1910	Haig, H. G., Nicholson-street, Fitzroy	
June 1888	*†Hall, T. S., M.A., D.Sc., University, Carlton	Gen. Bio., Geo. (Grapt.)
Dec. 1905	*Hamilton, Jas. T., F.L.S., Heidelberg-rd., Ivanhoe	Bot., Geol.
Sept. 1887	Hammet, E. R., State School, Loch	
Sept. 1909	Handley, Edgar, 74 Park-st., North Fitzroy	
Nov. 1901	*†Hardy, A. D., F.L.S., F.R.M.S., Forests Dept., Melbourne	Bot. (Freshwtr. Algæ)
Aug. 1887	† Hart, T. S., M.A., School of Mines, Ballarat	Geology, Bot.
July 1899	Hartnell, W. A., "Irrewarra," Burke-road, Camberwell	
Dec. 1905	*†Harvey, J. H., A.R.I.V.A., 128 Powlett-st., East Melbourne	
June 1910	Helms, Otto, State School, Laver's Hill	
Jan. 1884	* Hill, G. R., "Glenrowan," Dandenong-road, Windsor	
Aug. 1909	Hill, G. F., Dandenong-road, Windsor ...	Ornithology
April 1901	†Hill, J. A., Kewell, *viâ* Murtoa	Ent., Orn.
Mar. 1907	Horner, Miss L., State School, Castlemaine	
May 1910	Horner, H. E., Tintern-avenue, Toorak	
Sept. 1910	Ingle, Daniel, Healesville	
Dec. 1911	Isaac, C. E., State School, Coburg	
Aug. 1911	James, A., Continuation School, Melbourne	
April 1909	†Jarvis, E., Dept. Agriculture, Brisbane ...	Entomology
Jan. 1905	Jeffery, H. W., "Hazeldene," Cochrane-street, N. Brighton	
June 1910	Johnston, J., State Plantation, Creswick ...	Botany
Oct. 1911	Joshua, E. C., Malvern-road, Armadale	
April 1905	† Jutson, J. T., Geological Department, Perth, W.A.	Geology
April 1904	Kaufmann, J. C., LL.D., 21 Kooyongkoot-road, Hawthorn	Pond Life, Mic.
Feb. 1886	*†Keartland, G. A., *Age* Office, Collins-street, M.	Ornith., Oology
July 1911	Keble, R. A., Geological Survey Office, Melb.	
Feb. 1907	Kellock, C. F., Sloyd Centre, Castlemaine	
July 1908	† Kelly, Reginald, Healesville	Botany
Nov. 1905	Kendall, H., 14 Rathmines-grove, Auburn	
Feb. 1906	Keppel, Miss K., Marysville	
Mar. 1888	*† Kershaw, J. A., F.E.S., National Museum, M.	Zoology.
July 1893	†Kitson, A. E., F.G.S., c/o J. S. Kitson, Continuation School, Melbourne	Geology
June 1903	Kitson, J. S., Continuation School, Melbourne ...	Geology
Feb. 1912	Lambie, Jas., Glenferrie House, Glenferrie	
Dec. 1902	*†Leach, J. A., M.Sc., Education Dept., M. ...	Biology, Geol.
May 1903	Lees, E. H., C.E., F.R.A.S., Fairhaven, Mallacoota	

Oct. 1905	*†Le Souëf, D., C.M.Z.S., Royal Park, Parkville	Ornith., Oology
Aug. 1907	Lindsay, J., State School, Wannon	
Feb. 1902	Luly, W. H., Spring-street, Preston	
April 1888	† Lyell, G., jun., F.E.S., Gisborne	Ent. (Lep.)
June 1887	*† Macgillivray, Dr. W., Broken Hill, N.S.W.	Ornith., Oology
Jan. 1907	Mackeddie, Dr. J. F., Collins-street, Melbourne	
Nov. 1911	Mackenzie, M. G., Lands Department, Melbourne	
June 1911	* Mackintosh, W. G., Brighton-road, St. Kilda	
Dec. 1902	† Madden, Hon. Sir F., M.L.A., Studley Park, Kew	
Jan. 1908	† Mahony, D. J., M.Sc., Dept. of Mines, M. ...	Geology
Nov. 1904	† Maplestone, C. M., Eltham	Polyzoa (recent, fossil)
Feb. 1910	Marshall, J. E., State School, Kew	
Nov. 1895	*† Mattingley, A. H. E., C.M.Z.S., Glenferrie-road, Kew	Ornithology
May 1885	† McAlpine, D., Mathoura-road, Toorak ...	Botany
July 1894	* McCaw, W. J., 7 Liddiard-street, Glenferrie ...	Zoology
July 1911	McGowan, W., City Park, Launceston	
May 1910	McLennan, C. M., P.O., Bourke-street East, Melbourne	
June 1904	*McLennan, J. P., Agric. High School, Warragul	Botany
Jan. 1904	McMahon, W. Hugh, Liebig-street, Warrnambool	
Aug. 1899	McNab, L. K., "Braeside," Waiora-rd., Caulfield	
Dec. 1910	Mesley, A., Agricultural College, Dookie	
July 1911	Meyer, L. D., Milroy-st., North Brighton	
June 1911	Mitchell, R., Manningham-street, Parkville	
June 1904	Montgomery, Miss M. H., State Schl., Clifton Hill	
July 1899	Morgan, W. J., 11 Robb-street, Essendon	
Nov. 1884	Morrison, Dr. A., Rokeby-road, Subiaco, Perth, W.A.	Botany
Oct. 1895	Mowling, G., "Athol," Auburn-road, Hawthorn	
Aug. 1911	Murdoch, J. R., Park-street, Parkville	
Oct. 1911	Nethercote, Miss G., Callantina-road, Glenferrie	
April 1903	† Nicholls, E. B., 164 Victoria-st., North M. ...	Ornithology
Dec. 1908	†O'Donoghue, J. G., City-road, S. Melbourne ...	Ornithology
Dec. 1904	Oke, Chas., 56 Chaucer-street, St. Kilda ...	Entomology
May 1902	O'Neil, W. J., Department of Lands, Melbourne	
Feb. 1911	Parsons, Frederick, State School, Lara	
Mar. 1910	Petherick, E. A., F.L.S., F.R.G.S., 254 Albert-street, East Melbourne	
May 1880	*†† Pitcher, F., Botanical Gardens, Melbourne ...	Botany
Sept. 1901	† Pritchard, G. B., D.Sc., F.G.S., Kooyong Koot-road, Hawthorn	Geology, Conc.
May 1892	Quiney, H., Mortlake	Ornithology
Mar. 1911	Quinlan, C. V., F.R.G.S., Forests Department, M.	
May 1909	Raff, Miss J., M.Sc., 86 Fitzgibbon-st., Parkville	Botany
May 1905	Randall, Miss M., "Litchfield," Primrose-street, Essendon	
April 1909	Ritchie, Miss E. M., Hotham-st., Balaclava	
Aug. 1908	Robertson, J. L., M.A., 35 Hutcheson-st., Moonee Ponds	
Oct. 1911	Robinson, C. A., Lands Office, Sale	
Jan. 1903	*Roger, W. H. A., 19 Wattletree-rd., Armadale	Ent. (Lep.)
May 1904	Rollo, Miss J., 65 Tivoli-road, South Yarra	
Nov. 1910	Rosenhain, Oscar, 482–484 Collins-street, Melb.	
Mar. 1899	Ross, J. Andrews, Rochester	
Nov. 1896	Ryan, Dr. C., 37 Collins-street, Melbourne ...	Ornith., Oology
Jan. 1910	Ryan, Dr. E., Collins-street, Melbourne	
Jan. 1910	Ryan, Dr. T. F., Nhill	

Sept.	1908	Sarovich, Mrs. C. J., Beach-st., Port Melbourne	
Jan.	1909	Scott, Alex. L., 27 Evelina-road, Toorak ...	Geology
Nov.	1885	Scott, W., 54 Fletcher-street, Essendon	
July	1885	†Searle, J., 274 Collins-street, Melbourne ...	Entomostraca
Oct.	1909	Semple, Dr. W. H., Kilmore	
Sept.	1910	Shaw, Dr. A. E., F.E.S., Healesville ...	Entomology
May	1889	* †Shephard, J., Clarke-st., South Melbourne ...	Pond life
July	1884	*Simson, Mrs. J., "Trawalla," Toorak	
July	1884	Simson, Miss, "Trawalla," Toorak	
May	1905	Skeats, Professor E. W., D.Sc., Univ., Carlton ...	Geology
June	1906	Slack, T., State School, Bacchus Marsh	
May	1880	*o* †Sloane, T. G., "Moorilla," Young, N.S.W.	Ent. (Col.)
May	1902	Smith, A. J., Port Albert	
July	1910	Smith, Sydney, 45 Hoddle-street, Richmond	
Dec.	1901	Somers, Dr. J., Edgeworth, Mornington	
Jan.	1903	Spark, J. M., Harding-street, Surrey Hills	
Aug.	1887	* †Spencer, Professor W. Baldwin, C.M.G., D.Sc., M.A., F.R.S., University, Carlton ...	Biol., Zoology
Feb.	1882	† Spry, F., Heather-street, South Melbourne ...	Entomology
Nov.	1908	†St. John, P. R. H., Mason-street, South Yarra	Botany
Nov.	1911	Stanton, B. L., Princess-street, Kew	
Jan.	1908	Stephen, W. J., 32 Robinson's-road, Hawthorn	
Nov.	1880	Stickland, J., Latrobe-street, Melbourne ...	Pond life
July	1885	* †Stickland, W., Latrobe-street, Melbourne ...	Pond life
July	1911	Stout, C., Gillies-st., Fairfield	
Sept.	1911	Summers, R. E., Were-street, Brighton	
Nov.	1900	* †Sutton, Dr. C. S., Rathdown-street, N. Carlton	Botany
May	1910	Sutton, Dr. Harvey, Education Dept., Melbourne	
July	1886	* †Sweet, G., F.G.S., "The Close," Wilson-st., Brunswick	Geology
Jan.	1911	† Sweet, Miss G., D.Sc., Melbourne University	
July	1910	Templeton, Mrs. Carrie, George-street, E.M.	
Dec.	1892	Thiele, A. F., Doncaster	
Oct.	1909	Thiele, E. F., Doncaster	Ornithology
Aug.	1910	Thomas, F. J., Lindenow	
Jan.	1908	Thomson, Capt. W. C., Ascot, Brisbane, Qld.	
Feb.	1904	Thomson, Dr. J. R. M., Violet Town	
Sept.	1900	† Thorn, W., Mines Department, Melbourne	
April	1883	* †Topp, C. A., M.A., LL.B., I.S.O., Royal-crescent, Armadale	Botany
Aug.	1907	†Tovey, J. R., National Herbarium, South Yarra	Botany
Sept.	1910	Traill, Mrs. W. J., Beaconsfield-parade, Albert Park	
April	1904	Trebilcock, R. E., Wellington-street, Kerang ...	Ent. (Lep.)
June	1904	Turner, Miss E. J., "The Grange," Domain-rd., South Yarra	
Jan.	1910	Twyford, J., 9 Villiers-street, Elsternwick ...	Microscopy
Dec.	1908	Walcott, R.H., F.G.S., National Museum, M. ...	Mineralogy
Nov.	1891	Walker, J. B., Mackillop-street, Melbourne	
Jan.	1908	Wallace, Rev. H., Violet Town	
June	1904	† Waterhouse, G. A., B.Sc., F.E.S., Moore-street, Sydney, N.S.W.	Ent. (Lep.)
Sept.	1908	*Waters, C., Continuation School, Melbourne	
Aug.	1911	Watson, F., Madeline-street, Carlton	
Nov.	1901	† Weindorfer, G., "Roland Lea," Kindred, Tas.	Botany
May	1906	Wettenhall, Dr. R., Rockley-road, South Yarra	
May	1905	White, Miss R. E. J., D.Sc., Observatory Quarters, South Yarra	Botany
Sept.	1898	Wilcox, J., 4 Loch-street, Hawthorn	
Jan.	1901	†Williamson, H. B., Linton	Botany
Sept.	1907	Wilson, H. W., Chelsea-street, Brighton ...	Pond life, Geol.

July 1904 Wilson, J., Moorabbin Pharmacy, Cheltenham
May 1880 *o**†Wisewould, F., Imperial Chambers, 408 Collins-street, Melbourne
July 1902 Wisewould, Miss G., Seymour-road, Elsternwick
Oct. 1898 Wollen, A., c/o Tilloch and Co., Kent-street, Sydney ... ... Orn., Ent.
Nov. 1911 Wright, H. B., 172 William-street, Melbourne
Mar. 1908 Wrigley, Miss E., Kent-street, Ascot Vale.

REFERENCES.

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Transactions and Proceedings of Royal Geographical Society (Victorian Branch).
The Emu: the Journal of the Royal Australasian Ornithologists' Union.
The Geelong Naturalist (Geelong Field Naturalists' Club).

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Publications of the Department of Mines and Agriculture.
,, Department of Fisheries.
,, Government Botanist, Sydney.
,, Australian Museum, Sydney.
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Proceedings of the Linnean Society of New South Wales.
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Proceedings of the Royal Society of Queensland.
The Queensland Naturalist (Brisbane Field Naturalists' Club).

SOUTH AUSTRALIA—
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TASMANIA—
Papers and Proceedings of Royal Society of Tasmania.
The Tasmanian Naturalist (Tasmanian Field Naturalists' Club, Hobart).

WESTERN AUSTRALIA—
Records of the Western Australian Museum, Perth.
Journal of the West Australian Natural History Society, Perth.

NEW ZEALAND—
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Records of the Canterbury Museum, Christchurch.

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Knowledge (London).
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United Empire: The Journal of the Royal Colonial Institute, London.
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Mitteilungen aus dem Naturhistorischen Museum, Hamburg.
Bulletin of the Geological Institute, University of Upsala, Sweden.

ASIA—
Annotationes Zoologicæ Japonensis (Tokyo Zoological Society, Japan).

NORTH AMERICA—
Transactions of the Nova Scotia Institute.

UNITED STATES—
Publications of the Smithsonian Institute, Washington, U.S.A.
Publications of the American Museum of Natural History, New York.
Proceedings of the Academy of Natural Sciences, Philadelphia.
Proceedings of the Boston Natural History Society.

UNITED STATES—*continued.*
Publications of the Field Columbian Museum, Chicago.
Publications of the Missouri Botanical Gardens, St. Louis, Mo.
Transactions of the Wisconsin Academy.
Bulletin of the Buffalo Society of Natural Science.
Bulletin of the Wilson Ornithological Club, Oberlin, Ohio.
Minnesota Botanical Studies, University, Minnesota.
Publications of the University of California, Cal.
Pomona Journal of Entomology, Pomona College, Claremont, Cal.
Publications of the Lloyd Library, Cincinatti, O.
Proceedings Hawaiian Entomological Society.

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Revista do Museo Paulista, S. Paulo, Brazil.

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